THE ECONOMIC BASIS FOR THE TEACHER'S WAGE

By

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EDITOR'S INTRODUCTION

To discover a sound basis for determining what is an adequate salary for a teacher has long been a serious administrative problem, now made more acute by the immediate economic depression. In the past, standards for the solution of the problem have usually been derived from sources within the realm of education, differing opinions merely reflecting a different evaluation of these sources. To make for progress toward a solution there is need for a new interpretation of the problem, a realignment of old values, an infusion of new meanings, all of which necessitate some new methods of attack. In the present study, the author has examined the problem of salaries from the viewpoint of the contribution of the teacher to the economic welfare of society, recognizing, withal, that he is dealing with only one factor, yet an important one, in the multitude of relationships existing between the school and society as a whole.

Beginning with the theory of A. C. Pigou, that the national dividend will be at a maximum when occupational groups requiring equally scarce native abilities receive equal marginal incomes, this study, by statistical procedures, shows the place of teachers on such a most-advantage-to-society scale, thereby offering new evidence for a more intelligent reconsideration of the problem. By original, concatenated thinking the author formulates certain implications for the immediate and future improvement of practice. While many may disagree with the findings and the suggestions for their use, the study should open the way for a large number of valuable researches. To rebuild a road already traversed by others is an important and necessary task, but to lay out a new road, through a virgin forest, is a rare and more thrilling adventure. The latter represents the real contribution of this volume.

L. THOMAS HOPKINS

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FOREWORD

One of the urgent needs of the economic world to-day is a basis for determining what is a fair wage for any individual. To teachers it is a problem of pressing importance to estimate fairly the economic worth of their particular services. School administrators on the other hand face a real difficulty in judging what salaries for teachers can be justified from the point of view of public welfare.

These problems constitute the subject matter of this study, which attempts to deal with them in a fundamental manner. In my opinion the following pages present an outstanding contribution to education and to economic welfare. Many will disagree with some of the findings, but I do not think anyone can read the report and not be impressed with the insight, the ingenuity, and the courage with which the problems have been attacked. The study breaks new ground in education and suggests many leads which, if pursued, must have valuable results.

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IT IS difficult to acknowledge adequately the part played in the development of this study by the work, thought, and counsel of Professor Harold F. Clark of Teachers College, Columbia University. His ready and understanding guidance has been available at all times, and, more than any other influence, has made the study possible. At the same time, Dr. Clark cannot be held responsible for the fact that the workmanship has not measured up to the inspiration.

Special appreciation is due to Professor J. R. McGaughy and Professor John K. Norton, who have critically read the manuscript and advised with the author, and to Professor Willard S. Elsbree, who began service on the committee prior to his absence on leave. To Professor David Snedden in particular, and to Professor Carter Alexander, are due thanks for the review of the manuscript and for important constructive suggestions.

No acknowledgment would be complete without mentioning two other men who have exerted powerful influence on the author's general background—Professor William H. Kilpatrick, for his significant contributions to the writer's social philosophy, and Professor George D. Strayer, for the constant reminder in his own activities and teaching that administration must have a broad philosophy.

Acknowledgment should be made of the uniformly generous attitude of various authors and publishers whose works are quoted throughout this study.

L. D.

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THE ECONOMIC BASIS FOR THE TEACHER'S WAGE

CHAPTER I

INTRODUCTION

STATEMENT OF THE PROBLEM

The present study got its original impetus from the following statement made by Professor A. B. Moehlman of the University of Michigan in his *Public School Finance* [34: 121]*:[1]

> The consideration of teachers' salaries should be approached from its economic and social aspects and not in terms of sentiment. The teacher is not in need of pity and cheap sentimentality, but requires only a clean-cut economic and social consideration to secure from the community adequate return for her services. Executive and teacher alike can learn to consider salaries from the standpoint of the economic laws set forth, and to realize that certain artificial restrictions or assumptions cannot hold over a period of years.

With admirable conciseness and precision this statement clears from the problem of teachers' salaries certain persistent irrelevancies, and indicates the general approach that must be used in its solution. Again, in indicating its importance to the administrator, Moehlman says [34: 13]:

> This knotty question (teachers' salaries) will always be a thorn in (the flesh of) administration until it is finally solved upon scientific principles rather than through the makeshift methods now generally practiced.

The question is, then, in a word, whether there is a sound economic basis for the determination of the teacher's wage.

The problem of the earnings of any occupational group of necessity raises the problem of the earnings of all groups. It is one of distribution of the total available earnings. The strictly economic approach to this problem becomes: How much can society afford in its own dollars-and-cents interest to pay any given group? If it turns out that the manner of distribution has any effect on general economic welfare, it follows that there must be degrees of better and of worse, and finally, an optimum distribution. If so much be learned, it will be plain not only that society cannot afford to pay more, but also that society cannot afford to pay less than such a wage to such a group. It is the purpose of this study to learn whether any such "fair" or optimum level of reward can be found for the teacher's service. Manifestly, any sound method of determining such an optimum level for one occupation will be capable of generalization for all groups.

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* Numbers in brackets indicate references in the Bibliography, pp. 96-101.

[1] All excerpts from this book are quoted by permission of Rand, McNally & Company.

The teacher is chosen in the present study because she represents the writer's professional interest.

PURPOSE OF THE STUDY

The attempt in this chapter will be further to clarify and narrow the problem by a more definite statement of the specific thing that will be attempted in the study, together with an equally definite statement of what the study is not designed to do. In addition, such assumptions as seem to lie at the basis of the thinking will be set forth.

The essential purpose is to find a sound economic *method* for determining, first, the economic "fair" wage for any occupational group; second, the economic "fair" wage of the teacher. Such a method will not result in an exact determination of a salary rate or schedule that any administrator may immediately use. It is the general method, rather than any practical application, which is of immediate concern. No exact and immediately usable determination can be evolved at this time, for two reasons. In the first place, we do not have sufficiently full or accurate economic data; in the second place, certain necessary subsidiary techniques for obtaining facts concerning persons are insufficiently refined. The nature of these two difficulties will become evident as the study is recorded.

In order that the procedure may be illustrated and made concrete, an attempt will be made to reach as accurate a determination as possible under the conditions, and one that will be capable of increasing accuracy as necessary data become available. This result, so far as it goes, will be the working out of a method which can, and apparently must, be used for the finding of economically sound relative wage levels among all occupational groups.

LIMITATIONS OF THE STUDY

The study will deal only with economic values. The existence of other values is recognized, and the preëminence of some of them is readily admitted. The justification for this limitation to the economic field must lie in the first of the assumptions to be stated in the next section.

The study will not deal with the question of the fitness or adequacy of the present teaching force—a question that would include a consideration of values that are not at present readily reducible to economic terms. The study will not deal with any question as to what constitutes desirable teaching traits; it will have to do only with the economically justifiable wage to be paid to any teaching group which society sees fit to demand or accept.

An attempt will be made, not to deal with the internal construction of salary schedules as such, but only by a defensible procedure to arrive at a tentative average wage for the typical teacher. The two general lines of technical refinement growing out of this general method that are immediately suggested are, first, a more exact application of the method by means of a greater elaboration of accurate data; and, second, the development of a set of index numbers to represent a variety of local conditions and of types of teaching services. These applications must of necessity wait for subsequent studies.

ASSUMPTIONS UNDERLYING THE STUDY

1. Economic welfare is not necessarily inimical to general welfare; on the contrary, it is probably in line with a more inclusive welfare, and to a degree necessary to general welfare.

2. The existing philosophical, economic, political, and emotional commitments of our national life are such that it would be to some degree futile to base this study on any order other than that of private competitive capitalism. The assumption is therefore made that, in spite of numerous instances of modifications of

principle in our social practice, we shall continue to hold to capitalism and gradually adapt it, rather than radically and suddenly change the whole order. This assumption is an attempt to estimate a trend rather than to argue the rightness of the trend. No such argument will be made, but it will be necessary to try to state the fundamental distinction that sets off private competitive capitalism from all other types of economic order.

3. The one essential characteristic of capitalism and the institution of private property is the recognition of inherent differences in ability among individuals, which cannot be leveled by any training whatsoever, linked with the belief that no enduring economic system can be built that does not allow these differences to win and to keep differential monetary rewards. A corollary to this belief is that if social welfare is to be promoted, it must be integrated with self-interest.

4. The social group taken as the basis for this study is the population of the United States, but this is by no means a finally necessary limitation.

CHAPTER II

RECENT HISTORY OF TEACHERS' SALARIES

EARLY PHASES OF THE PROBLEM

In classical times the typical teacher of children, in so far as he could be set off in his labors from the mother, was a slave. That no one of very great importance was engaged in teaching is noted by Almack and Lang [1 : 4]:[1]

> The ancient Greek regard for the profession may be indicated by quoting the saying when any one had mysteriously disappeared—"Perhaps he has become a schoolmaster."

There is little evidence of any great change in status during the long centuries extending to our own colonial period. The colonial teacher was very often an indentured servant. The following passages picture his condition.

> Wide as was the application of the indenture system of labor to the economic life of early America, it is a matter of curious interest, from the modern viewpoint, to find that it was no less generally applied to the first educational efforts of the groping young colonies. . . .
>
> An early custom in the South, afterward adopted in the middle colonies, was for a family or a group of families to purchase imported servants who were represented as being qualified to teach. One servant advertised himself for sale as a schoolmaster in Pennsylvania, stating that his indenture might be taken by a group of families for a period not to exceed seven years.
>
>> "Incoming servants were frequently mentioned as knowing Latin, and sometimes French and other languages, also as writing a good hand and being able to teach reading and accounts. Mention of these and the occasional notices of school masters who had run away, broken jail, and forged passes, show that servant school masters were common." [61 : 129][2]
>
> The diary of an English bookkeeper [61 : 129] who, "being reduced to the last shilling I hade, was obliged to go to Virginia for four years as a

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[1] All excerpts from this book are quoted by permission of Houghton Mifflin Company.

[2] All excerpts from the *History of Wages* are quoted by permission of the Bureau of Labor Statistics, Department of Labor, Washington, D. C.

> schoolmaster for Bedd, Board, washing and five pounds ($24.30) during the whole time," gives a fair idea of the way the system worked. He arrived at Fredericksburg, Va., in April, 1774, and after two weeks spent in search of a master he was bought by Colonel Daingerfield, a planter living "about seven miles below the Toun of Fredericksburgh," on the Rappahannock. He was given "a neat little house at the upper end of an Avenue of planting at 500 yards from the Main House, where I was to keep the school and Lodge myself in it." [61: 129]
>
> * * * * *
>
> Harrower's difficulties in finding a purchaser, while the boat builder, two coopers, and a barber who sailed with him sold readily, substantiates the statement of a contemporary that "schoolmasters did not find so ready a sale or bring such good prices as others." [61: 130]
>
> In spite of the fact that in the southern and middle colonies "it was largely the redemptioners and indentured servants that instructed the youths of the time," the schoolmaster of that class was not "a model of excellence."
>
>> "In fact he was not supposed to be, and his character was usually in keeping with his reputation. Too often their moral standard was low, their habits dissolute and their methods and discipline extremely crude. That sobriety was at a premium among this class may be inferred from the following advertisement: 'Wanted, a sober person that is capable of teaching a school; such a person coming well recommended may find encouragement in said employ.' There is no evidence that convicts were thus employed in Pennsylvania, but the servant formed no small proportion of the teaching force of the colony. Scarcely a vessel arrived in which there were not schoolmasters regularly advertised for sale. In none of the middle colonies at this time did the teacher occupy an exalted position. He was regarded as an unproductive laborer. Agricultural laborers or artisans were what the colony wanted and needed most, and they were nearly always sold at a higher price than the schoolmasters." [61: 139]

The average colonial teacher was a cheap commodity; at best he reflected the old economic discrimination, exaggerated under pioneer conditions, against the "unproductive" worker. Such a person naturally became a tolerated necessity, maintained by free subsistence and little, if any, wage. Such teachers were in charge of the first "public" schools.[3]

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[3] That the adjective "public" is not to be taken too seriously is argued by Professor Beard on pp. 179 ff. of his *Rise of American Civilization* (one-volume edition).

> Massachusetts, to the end "that learning may not be buried in ye grave of our fathers in ye church and commonwealth," established schools by law in 1647, ordering each town of 50 householders "to appoint one within their towne to teach all such children as shall resort to him to write and reade, whose wages shall be paid either by ye parents or masters of such children, or by ye inhabitants in general, by way of supply." Towns of 100 householders were ordered to "set up a grammar school, ye master thereof being able to instruct youth so farr as they may be fited for ye university." [61: 131]
>
> Several towns had schools before this law was enacted. Boston started one in 1635, and in 1644 the inhabitants of Dedham "did resolve and consent . . . to rayse the summe of £20 ($66.67) per annum toward maintaining a schoolmaster to keep a free school in our town." [61: 131] Dedham thereupon founded the first real public school, free to pupils and supported wholly out of tax funds.
>
> There was no uniformity in the salaries paid schoolmasters by the different towns. At the same time that Dedham was paying £20, Essex was paying only £14 ($46.67) and Watertown £30 ($100). "The Watertown salary continued about the same for some seventy years; in 1715 or 1720 it was raised to £36 ($120)." [61: 131]
>
> Dedham raised the salary of its school master in 1695 to £25 ($83.33) per year, "whereof eight pounds is to be in money, the other £17 ($56.67) in corne, Rye at 4s. (66.7 cents) per bushell and Indian corne at 3s. (50 cents) per bushell." [61: 131] The next year "the town began to pay the salary of the schoolmaster entirely in money." [61: 132] Thereafter the scale was £28 ($93.33) in 1705 and £200 ($88.67) in 1751. The last entry is in old tenor, and represented about £25 in lawful money, so that in actual money the salary was about the same for the entire half century [61: 131].
>
> The salary of President Rogers, of Harvard, as fixed by the court in 1682 was £100 ($333) in money and £50 ($166.67) in commodities; while each of his two assistants received £50 in money. [61: 133]

This position was practically unchanged until 1840. From the close of the eighteenth century until well into the nineteenth—

> The usual sum paid to a master was ten or twelve dollars a month, though a wealthy district might, in exceptional cases, give twenty dollars to retain a man of culture and experience. Women earned from four to ten dollars. Even after the middle of the nineteenth century the standard pay for a woman teacher in many districts was one dollar a week. Thus a "qualified woman teacher" in a Connecticut town in 1798 re-

> ceived a weekly stipend of sixty-seven cents, and some masters of that period were paid no more. Besides the money remuneration, the districts boarded the teachers. Otherwise the salary would have loomed much larger, and the town appropriation would have quickly melted away. The teacher "boarded round" among the homes of the pupils, spending at each house a length of time proportioned to the number of school children in the family. The custom was common until after 1850. [61: 133]

It is interesting to note that at the time of the Revolution, conditions in Europe were somewhat similar.

> In Provence, teachers attended fairs in order to find a market for their abilities. Their services were often sold on the auction block to the highest bidder. Writing on the status of teachers at this period, Compayre said, "They lived in wretched conditions without material independence and without moral dignity. The schoolmasters were far less teachers than sextons, choristers, beadles, bell-ringers, clockmakers, and even grave-diggers. Attendance at marriages was paid for at the rate of fifteen sols and dinner, while burial services were recompensed at the rate of twenty sols." [1: 5]

In this connection, the advertisement quoted by Beard from the *Philadelphia Mercury* (1735) and given in facsimile by E. P. Cubberley in his *Public Education in the United States* [17: 34],[4] is also of interest.

Advertisement

To Be *Disposed* of

A Likely Servant Mans Time
for 4 years who is very
well qualified for a Clerk
or to teach a School, he Reads,
Writes, understands Arithmetic
and Accompts very well,
Enquire of the Printer hereof.

In one or two of the quotations from the *History of Wages*, it may be discerned that in New York and Massachusetts, where education had already become a matter of social and public concern, the teacher was valued at a somewhat higher rate. It is, of course, true that he also served in other capacities, such as minister or accountant, and it is possibly to one of these supplementary occupations that his higher earnings may be reasonably attributed. If Professor Beard is right in his low estimate of interest in genuine public education, the latter would be the more valid explanation.

---

[4] All excerpts from this book are quoted by permission of Houghton Mifflin Company.

By 1840 the battle for public responsibility for education was on the way to being won. The relatively rapid development of community responsibility for education after this time operated to create some degree of economic scarcity of teaching services. This, in turn, tended to raise the value of teaching services. At the beginning of that period (1841) Burgess finds that women teachers in country schools were receiving an average salary of about $2.50 for each week that they taught.

> This salary included the value of board which many of them received as part of their compensation. In actual wages they received about $1.25 a week. For the period of 80 years, from that time until the present (1919) there has been a practically continuous rise in the salary of these teachers. [10: 25]

The following table is given by Burgess [10:49]:[5]

WEEKLY WAGES OF LABORERS, ARTISANS, AND TEACHERS

Worker	1841	1900	1919
Laborers	$4.86	$8.94	$23.02
Carpenters	8.16	16.10	33.57
Machinists	8.52	15.38	34.64
Printers	8.58	16.25	28.45
Women City Teachers	4.44	13.88	28.57

It will be noticed here that in 1841 women city teachers were receiving somewhat less than unskilled laborers. Burgess substantiates his statement concerning the slow, continuous rise of teachers' salaries by a table of weekly earnings of rural and city teachers and by a number of charts upon which he draws the actual curve of advance and trend lines determined by the method of least squares. Two periods may be noted in which there is a relative loss in rate of advance, followed by a rapid gain. These were, respectively, during and after the Civil War and the World War. In both cases the war-time inflation, with its attendant lessening in real wage, induced a rapid increase which continued to be permanent. In Burgess's table it will be noted that the earnings of women city teachers by 1919 had left common labor behind but had not achieved equality with those of skilled labor. In another chart [p. 69] Burgess shows the curves for the wages of laborers and artisans. Those of the laborers tend to be slightly more than half the rates for artisans. By 1915 a relatively more rapid rise of artisans' pay had placed members of that class almost twice as high as laborers. In another chart [p. 84] Burgess shows that the salaries of women teachers (city and rural) in 1915 had, on the average, reached seventy-five per cent of the wages of skilled labor, with the curve for common labor approximately half of that for skilled labor. This means that the average salary of women teachers in 1915 rested at a point halfway between those of the two labor groups.

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[5] Table and excerpts from this book are used by permission of The Russell Sage Foundation.

During the war years the more rapid response of the wages of laborers to the increased demand for their services, and to the inflation of all costs, raised laborers to a more favorable wage position than that held by teachers. By 1919 teachers' salaries were less than the wages of unskilled laborers. This situation resulted in the study of Professor Evenden [19] published in 1919, which may be said to have been the first attempt to apply scientific methods to the problem of the teacher's salary. The language of this report to some degree reflects the general high feeling of the war years. The mass of figures accumulated by Professor Evenden and a series of compelling arguments based upon those figures had the effect of shocking the country into readiness for a number of salary campaigns, which rapidly followed. In most of these movements, which were highly organized,[6] the appeal was to the public conscience. Communities were asked to give thought to the importance of the teacher's work and to provide "justice."

It is, of course, difficult to measure with any certainty the influence of various factors in the increases of salary that followed. Women had achieved suffrage during the war. Teachers had organized to the extent that some state organizations approached measurably near 100 per cent membership. The National Education Association grew in membership from 8,557 in 1918 to 87,414 in 1922; in two more years it reached 133,565 [36: 1165]. This national group had provided, under the chairmanship of Professor George D. Strayer, for Dr. Evenden's study and was aligned powerfully behind the report. One of the strongest arguments in the report was based on the evidence of an actual shortage of teachers throughout the country. That the appeals to the public conscience would have been as completely successful as they were without the economic effect of scarcity must be doubted. Under the stimulus of war conditions, teachers had gone into other occupations in very large numbers, and the arguments for increased salaries were clinched by the obvious pinch of scarcity. The failure of the sentimental appeal to be effective was evidenced by the subsequent shift to other methods of thoughtful educational leaders who were seeking to raise the standard of the service, once the post-war situation had been met. Dr. Evenden's study not only had met the emergency, but had pointed the way toward a more scientific attack of the problem. In dismissing the campaign method of adjusting teachers' salaries, it is sufficient to say that it deserved to be dropped as soon as it had done its work in an unforeseen emergency. The sentimental appeal, as a method of adjusting teachers' salaries, offers no criteria for determining what teachers actually should be paid. It is a stop-gap, effective only under desperate conditions, when the schools have been injured so grievously that the most careless lay opinion is based upon immediate knowledge of the situation, and it has no control for hysteria or group self-seeking. It is as likely to be socially and economically vicious as beneficent.

---

[6] The writer participated in a state-wide campaign in New Jersey, in which $15,000 was raised among the teachers for the employment of a professional campaign director.

EARLY SCIENTIFIC METHODS

Educational leaders throughout the country realized that not only must war losses to the schools be made good, but that a precarious social condition following the disorganization of war demanded a raising of school standards. Beginning with Professor Evenden's work, a number of studies of the salary situation were made and a nation-wide movement for a more scientific method of planning salary schedules got under way. Individual states set up their own studies, and a succession of school surveys under expert guidance contributed in all these studies, except that of Moehlman soon to be described, and possibly a few studies influenced by it. The essential criterion was that of the teacher's cost of living. Comparison with other occupational groups had been used by Dr. Evenden and occasionally formed part of other inquiries, but no scientific comparative study had as yet been utilized. One of the latest and most exhaustive of the cost-of-living type of studies is the one that Dr. J. R. McGaughy made under the special conditions existing in the city of New York [33].

All these studies were to some degree scientific. Most of them exhibited a considerable degree of impartiality, and they gathered and used facts. From a critical point of view they were not sufficiently scientific. They neglected some pertinent facts and failed to find others. Their chief weakness was that the basic reasoning was faulty. The cost-of-living method is essentially unsound, in that particular living standards and expenditures go up when wages rise. What this method fails to consider is that living standards themselves, rather than wages, are the dependent variable. Wages do not go up because they are needed; they go up only in response to increase in scarcity values of the service in question. All the need in the world, expressed by discrepancies between existing wages and costs of living, will not increase the wages of a group that gluts the market with its surplus numbers. The cost-of-living method attempts to use for a criterion of wage placement a standard that is itself a dependent resultant of the existing wage standard. The use of past and present expenditures as a basis of determining present and future wages is a perfect example of circular reasoning. With occasional exceptions, costs of living are necessarily determined by the existing wages and cannot *in themselves* dictate an increase in wages. The best that such a method can accomplish is a partial restoration of a prior relative wage position among occupational groups. It cannot possibly furnish criteria for an *economically sound* relative position. Finally, it neglects the fact, found by Professor H. L. Moore [35: 34] and confirmed by Burgess, that relative wage positions among groups have more stable relationships than those between wage levels and costs of living.[7] This finding will be treated more fully in a later chapter.

The method of Moehlman grew out of a critical examination and rejection of the earlier methods. The excerpt from his *Public School Finance* cited in the statement of the problem shows his feeling of the need for a method of determining the teacher's level of payment that will face economic facts squarely and find in them the determining criteria of the method. He estimates justly the force of the relatively more dependable relationships among wage levels of various groups found by Moore and Burgess. He recognizes further that arbitrary manipulation cannot control over long periods the economic law that scarcity value in a service determines the differential rate of payment.

In working out a salary schedule, Moehlman states the existing relationships between unskilled labor and any given teacher type. He then calculates index numbers expressing these relationships. Since the wage of unskilled labor in any given locality is relatively easy to determine, Moehlman then has, in his index figures, determiners for minimum and maximum wages for various teacher groups. Here, at least, is a method that is free from a variety of indeterminate value-prejudices as to what a teacher "ought" to receive; here is a method that faces the economic conditions in the community. Furthermore, this method is not limited to any given community, since index figures may be worked out for varying conditions.

From an economic point of view, critical examination of this proposal must cut deep. The method is first of all *too* realistic in establishing for its basis the existing wage of unskilled labor. The author justifies this by appealing to that economic theory which offers us only a modern refinement of the "iron law of

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[7] H. L. Moore, *Laws of Wages*, pp. 34, 39. Correlations found for unskilled labor in eighty-seven Departments of France in 1896 were as follows:

Means of subsistence and wages	$r = .306$
Wages of unskilled and skilled labor	$r = .775$

Account should be taken of the fact that the relationship between cost of living and wages should be much closer for unskilled labor than for any other group, since unskilled laborers must use so large a proportion of their earnings for bare necessities.

Burgess, W. R., *Trends of School Costs*, p. 68. Correlations differing from Moore's in that they cover a term of years rather than a variety of localities were found by Burgess as follows:

Wages of laborers and cost of living	$r = .56$
Wages of laborers and wages of artisans	$r = .89$

wages." To see fully what is wrong with this position, it is necessary to examine the entire school of theory, which has been, in effect, a refinement of the first Ricardian statement—a statement that tended to consign unskilled labor forever to a subsistence wage. It is true that later economists of this group have relinquished the wages-fund theory, which assumed that one laborer could only take from another, but these later economists have not relinquished the underlying individualism and class-dividing notions that made easy the acceptance of existing rates of pay for common labor, which at all times have been the natural result of an over-supply of such labor maintained by artificial, socially tolerated barriers. Modern economic theory, especially such as will be shown in the work of A. C. Pigou, as well as practical business genius, has turned away from this vicious limitation. Individualism has given way to corporate and socialized motivation. At a later point this study shows that general economic welfare furnishes adequate criteria for wage relationships. Although it is still true that the laborer tends to get what he produces, it is *not* true that his production must be limited as it has been in the past.

These conditions remove the chief attraction that Moehlman found in the wage of common labor as a basis. This wage tended to be relatively stable because there had always been artificial restraints upon the laborer's opportunity to move to higher wage levels. By tolerating a continuous over-supply of labor, society had kept the wage of labor just high enough to prevent unskilled laborers from disappearing into vagrancy, criminality, and starvation. No such basis can have any final economic justification except in the opinion of frankly exploiting classes. From a rigorously logical point of view, the relationship that happens to exist between unskilled labor and another occupational group does not furnish a criterion for the justification of this existing relationship. This relationship is the result of a complex set of forces, among the most important of which are artificial barriers tolerated by society but not necessarily inherent in our economic system. A criterion which indicates an escape from these difficulties is available and will form the essential contribution of this study.

A minor objection to Moehlman's method is that its basis in the individual community is too narrow. Many communities could apply his method without any strong tendency to develop a general point of view or standard in the evaluation of teaching service as a whole. A better procedure would seem to be to determine the general level and subsequently to develop index figures from this vantage point. In spite of the fact that it is recognized to be a long scientific step forward in dealing with teachers' salaries, Moehlman's method is rejected because it fails to set up any criterion for the teacher's wage, except an accidental and imperfectly understood relationship to the rate of pay for unskilled labor.

CHAPTER III

THE ECONOMIC DEFINITION OF A FAIR WAGE

RELATION OF INCOME DISTRIBUTION TO WAGES

THE attempt in this chapter will be to make clear a criterion of "fair" wages which has become in its modern form wholly economic. As finally stated, it is the work of Professor A. C. Pigou and is set forth in his *Economics of Welfare* [46].[1] To make clear his theory and proof as a general background for the immediate application to the problem of this study is all that is attempted at this point.

Professor Pigou says in his Preface, "It would be idle to pretend that the book is other than a severe one." The severity lies largely in the very great thoroughness of thought which makes it difficult to excerpt brief and simple statements that present his conclusions. The present chapter leans most heavily upon his Chapters I to IX in Part II and Chapters IX and XIV in Part III. These are recommended to the reader who finds unsatisfactory the brief treatment that is possible here.

The manner of distribution of income among various persons and various occupational groups must have some effect upon economic welfare. This is easy to show in a society composed of two persons. If one obtains and holds all the wealth as it is produced, the other will starve. Transfers from the relatively rich member must necessarily satisfy the more acute demands of the starving member. Professor Pigou says:

> The old "law of diminishing utility" thus leads securely to the proposition: Any cause which increases the absolute share of real income in the hands of the poor, provided that it does not lead to a contraction in the size of the national dividend from any point of view, will, in general, increase economic welfare. . . . The loss of economic welfare suffered by the rich when command over resources is transferred from

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[1] All excerpts from *The Economics of Welfare* are quoted by permission of The Macmillan Company.

> them to the poor will, therefore, be substantially smaller relatively to the gain of economic welfare to the poor than a consideration of the law of diminishing utility taken by itself suggests. [pp. 91–92]
>
> We must not hesitate, therefore, to conclude that, so long as the dividend as a whole is not diminished, any increase, within wide limits, in the real income enjoyed by the poorer classes, at the expense of an equal decrease in that enjoyed by the richer classes, is practically certain to involve an addition to economic welfare. [p. 98]

The worst possible distribution in a community of a number of persons would be one in which all the income accrued to but one man. It is self-evident that this situation can be improved. There are degrees of better and worse distribution in terms of general economic welfare. The question immediately arises, What is the best possible form of distribution? This Pigou shows to be, in brief, a condition where occupations requiring equal ability receive equal pay. Marshall had already laid down a definition of fair wages when he said that wages of a particular group are fair, relative to wages in industries in general, if, allowance being made for differences in the steadiness in the demand for labor, "they [wages] are about on a level with the payment made for tasks in other trades which are of equal difficulty and disagreeableness, which require equally rare natural abilities and an equally expensive training" [48: xiii].

Pigou's definition of a fair distribution is as follows:

> Provided that the wages paid to workpeople in all places and occupations were equal to the values of the marginal net product of their work—possible divergences between private and social net product are, for the present purpose, ignored—and provided that the distribution of all grades of workpeople among different places and occupations were ideal, in the sense given to that term in Chapter IX, subject to the existence of local differences in the cost of living, there would be established between different people's wages a certain relation. *This relation I define as fair.* As between exactly similar persons it is evidently equivalent to a relation of equality of real wages. My definition thus conforms to that given by Marshall. . . . [p. 549]

Marshall's statement was a summary of his own observation of economic life as it existed. His theory rested partly on ethical assumptions. The contribution of Pigou was to establish the same definition upon the quantitative criterion of total national dividend to society. He says, in effect, that if the total economic return is to be raised to its highest level, equal ability must receive equal returns. In order to make clear the manner of his proof, it is necessary to pause for a moment to define certain general terms that he uses. These definitions are given in his own words and in those of Professor J. B. Clark, whom he quotes.

Marginal Net Product

> The marginal net product of a factor of production is the difference that would be made to the aggregate product by withdrawing *any* (small) unit of the factor. The marginal unit is thus not any particular unit. Still less is it the worst unit in existence—the most incompetent workman who is employed at all—as some writers have supposed! It is *any* (small) unit out of the aggregate of units, *all exactly alike*, into which we imagine this aggregate to be divided. Though, however, the marginal unit is thus *any* unit, it is not any unit *however placed*. On the contrary, it is any unit *conceived as placed at the margin*. [p. 135]
>
> This is the conception we need. It is excellently illustrated by Professor J. B. Clark. The marginal increment of capital invested in a railway corporation is in reality, he writes, "a difference between two kinds of plant for carrying goods and passengers. One of these is the railroad as it stands, with all its equipment brought up to the highest pitch of perfection that is possible with the present resources. The other is the road built and equipped as it would have been if the resources had been by one degree less. A difference in all-round quality between an actual and a possible railroad is in reality the final increment of capital now used by the actual corporation. The product of that last unit of capital is the difference between what the road actually produces and what it would have produced if it had been made one degree poorer." [p. 135]

Marginal Social Net Product

> The marginal social net product is the total net product of physical things or objective services due to the marginal increment of resources in any given use or place, no matter to whom any part of this product may accrue. [p. 136]

Marginal Private Net Product

> The marginal private net product is that part of the total net product of physical things or objective services due to the marginal increment

> of resources in any given use or place which accrues to the person responsible for investing resources there. In some conditions this is equal to, in some it is greater than, in others it is less than the marginal social net product.
>
> The value of the marginal social net product of any quantity of resources employed in any use or place is simply the sum of money which the marginal social net product is worth in the market. In like manner the value of the marginal private net product is the sum of money which the marginal private net product is worth in the market. Thus, when the marginal social net product and the marginal private net product are identical and the person responsible for the investment sells what accrues to him, the value of both sorts of marginal net products in respect of a given volume of resources is equal to the increment of product multiplied by the price per unit at which the product is sold when that volume of resources is being employed in producing it. [pp. 136–37]

For the sake of simplicity, marginal private net product may be thought of, in the case of a worker, as his earnings, and marginal social net product as the net value that his work contributes to the general economic welfare.

The following excerpts give the essentials of the argument to show the necessity for equalizing the values of marginal social net products if the total income is to be its largest aggregate.

> 1. Whenever . . . the value of the marginal social net product of resources is less in any one use than it is in any other, the money measure of satisfaction in the aggregate can be increased by transferring resources from the use where the value of the marginal social net product is smaller to the use where it is larger. It follows that, since, *ex hypothesi*, there is only one arrangement of resources that will make the values of the marginal social net products equal in all uses, this arrangement is necessarily the one that makes the national dividend, as here defined, a maximum.
>
> 2. This conclusion may be extended to show that, when complete equality among the values of marginal social net products is wanting, a diminution in the degree of inequality that exists among them is likely to benefit the national dividend. [pp. 138–39]
>
> Thus, if the distribution of resources is so altered that a number of values of marginal social net products which are below the average are all increased, or if a number which are above the average are all diminished, it is certain that the dividend will be increased. [p. 139]

> Allowance being made for costs of movement, it is true that the dividend cannot reach the maximum attainable amount *unless* the values of the marginal social net products of resources in all uses are equal. For, if they are not equal, the dividend can always be increased by a transference of resources from the margin of some uses to the margin of others. [p. 142]
>
> The analysis of the preceding Part showed that, if the national dividend is to stand absolutely at its maximum, the values of the marginal social net products of every form of resource in all uses must be equal. It showed, further, that in many occupations marginal social net product differs from marginal private net product. Hence the maximisation of the national dividend does not require that the values of marginal private net products shall be equal in all uses. On the contrary, such a condition of universal equality is incompatible with maximisation. In spite of this, however, our argument showed that any departure from equality at any point, brought about otherwise than with the deliberate design of improving the dividend, *is likely* to indicate a lapse on the part of the dividend below the level at which it might have stood. This general result is applicable to labour. Any failure from equality in the values of the marginal private net products of labour of any grade—values that are always equivalent to the demand prices, and generally equivalent to the wages paid per efficiency unit, at different points—*probably* indicates a distribution of labour between different points other than the distribution most favourable to the national dividend. In general, therefore, causes of failure from equality in the demand prices and wage-rates of labour of given quality at different points are also causes of injury to the national dividend. These causes may be divided into three broad groups—ignorance or imperfect knowledge, costs of movement, and restrictions imposed upon movement from outside. [pp. 488–89]

Professor Pigou, in a footnote on page 99, uses a mathematical proof of the probability that any diminution in the inequality of distribution increases the aggregate sum of satisfactions.

By the use of Figure 1 his argument on page 139 becomes concrete. The line xy represents a level at which the values of resources in the various uses A, B, C, to K would become equal. The scale at the left indicates various units of resources, n, $2n$, etc., measured positively and negatively from zero. The values of all resources below the line xy are less than those above the line. It may be seen that the transfer of $2n$ resources from use at *A* to use at *K* will raise the $2n$ values from smaller to larger amounts. In like manner, resources at *B*, *C*, and *D*, if transferred to *J*, *I*, *H*, and *G*, would increase in value. This process could go on only until all resources below the line of equality had been transferred to uses above this line. No matter what the number of uses, if resources were continually free to move from points of lower value to those of higher value, the limit of such movement would necessarily be a lower level in which marginal resources in all uses were equal. If *A*, *B*, *C*, to *K* be thought of as occupational services, what we have been describing is the removal of workers from low-paid occupation *A* to high-paid occupation *K*, and so on. The same result would come about finally if the movement began with workers going from *F* to *G*, *E* to *F*, etc. As long as the workers were entirely free to move to *any* occupation at higher rates of pay, the ultimate result would be the equalization of rates of pay to marginal workers in all occupations and to workers at equal distances above the margin in all occupations.

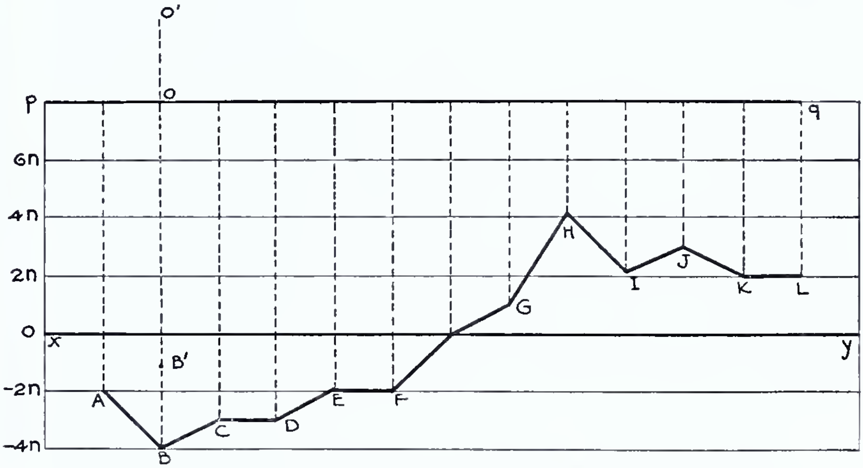

FIGURE I. Resources Yielding Differing Marginal Products

At this point it is necessary to revert to a proviso in Marshall's definition given above where he recommends that allowances be made for "differences in the steadiness of the demand" for labor. Pigou discusses this proviso in Part III, Chapter XVI. In Figure

1, line *pq* represents a base line from which distances to *A*, *B*, *C* measure respectively numbers of workers in the occupation *in relation to demand for such work.* In the transfers described above, the long dashed lines and low values at *A*, *B*, to *F* reflect the over-supply of workers relative to the demand. For the sake of simplicity, demand as between occupations is considered to remain unchanged. An increase in demand in any occupation without increase in numbers would have operated, so far as the chart is concerned, in exactly the same way as movement to a higher-paid group. Raising demand to point *O'*, since *OB* remains unchanged, merely raises *B* an equal distance to *B'*. Wages would have gone up in response to the increased demand, and the occupation in question would have had to be represented at a higher point on the chart. The truth of the thesis is in no way altered by the fact that changes in demand as between occupations would cause considerable minor disturbances of the level of equalized marginal resources.

TENDENCY OF ECONOMIC FORCES TO EQUALIZE MARGINAL VALUES

Both statements of the definition of fair wage contain references to ability. Pigou says, "As between *exactly similar persons*, it [a fair wage] is evidently equivalent to a relation of equality of real wages." Marshall says that payment for tasks that require "*equally rare natural ability*" must be equal. Here we have a differential factor between persons which cannot be entirely wiped out by any social arrangements whatsoever. In Figure 1, workers from *A* may not be able to move to *G* because *G* requires a degree of ability that *A* cannot supply. If *G* requires a larger number of persons of a given ability than the total population supplies, there will be a permanent shortage of such persons in relation to the demand. This shortage will result in a permanent high wage at *G*. The line from *G* to *pq*, which indicates relation of numbers to demand, will remain permanently short, and the marginal worker in occupation *G* will always receive a wage higher than the general marginal level. Thus it is seen that marginal equality can exist in relation to equally scarce native abilities required in occupations only in so far as these abilities are a residue unaffected by any social management or training. Marshall's other provisos—equal difficulty, equal disagreeableness, and equally expensive training—are not thus unalterable, in so far as difficulty means hardship as distinct from demand upon ability. Difficulty, in the sense suggested, and disagreeableness are manageable by society by mechanization, by specialization, or by some other means. To a considerable extent, expense of training is also socially manageable. This point comes more naturally into the section immediately following.

Pigou shows further that this optimum condition of equalized marginal values would come about naturally through the play of economic forces if all barriers were removed that prevent differential natural ability from obtaining its maximum reward.

> 2. Anybody who has control of any quantity of any form of productive resource will try so to distribute it among various uses that it brings him the largest possible money receipts. If he thinks that, apart from cost of carriage and so on, he can get more money by transferring a unit from any one use to any other, he will do so. It follows that the free play of self-interest, so far as it is not hampered by ignorance, tends, in the absence of costs of movement, so to distribute resources among different uses and places as to render rates of return everywhere equal. By an easy extension of the argument it can be shown that, where there *are* costs of movement, the free play of self-interest, again so far as it is not hampered by ignorance, tends, not to bring about equality in rates of return, but to prevent any divergences from equality in excess of those that, relatively to the fact that there are costs of movement, allow the sum total of returns to attain a maximum.
>
> 3. It follows that, if private and social net products everywhere coincide, the free play of self-interest, so far as it is not hampered by ignorance, will tend to bring about such a distribution of resources among different uses and places as will raise the national dividend and, with it, the sum of economic welfare to *a* maximum. . . . The essential point for our present purpose is that, when marginal private net products and marginal social net products coincide, any obstacles that obstruct the free play of self-interest will, in general, damage the national dividend. [pp. 144–45]

BARRIERS TO OCCUPATIONAL MOBILITY

Throughout Part III, Chapter IX, Professor Pigou discusses the kinds of barriers that prevent the natural flow of workers from lower- to higher-paid occupations. He divides these barriers into three general types: (*a*) ignorance, (*b*) costs of movement, and (*c*) restrictions imposed from outside.

a. The first barrier, ignorance, is of two types. A general type of ignorance that limits free occupational mobility results from the failure of society to train people to the highest limits of capacity and individual ability. A specific form of ignorance is the lack of knowledge of particular occupational opportunities, both at the time of entrance into work and at later times when the worker might change his occupation.

b. Costs of movement are also of two kinds. These are related to the kinds of ignorance just cited: they include the costs of sufficient training, of reëducation after technological displacement, and of continued education to provide continuous improvement in the worker's skill and understanding in order to keep him abreast of improved technology in his own or other fields. These costs all furnish formidable barriers to the worker. Society has not seen fit to remove these barriers by assuming them as a general responsibility. Specific costs of movement are such as those involved in the costs of advertisement or fees to employment agencies and in removing one's family, oneself, and one's household to a new place of occupation. In the case of both ignorance and costs, the specific forms are most easily manageable. There is nothing to prevent the establishment of public employment agencies or the publication of daily news reports of employment opportunities as detailed as those of the stock exchange. Removal of the general barriers waits upon an increased enlightenment of society as to the factors of its own best economic welfare.

c. The third barrier, restrictions imposed from outside, arises from a complexity of traditions and attitudes toward occupations, races, and sex—all of which tend to hold workers in given occupations, to bar them out of others, and to prejudice them against entering certain groups. Such attempts at control as union rules and unnecessary legal restrictions procured by groups in their own interest come into this third class.

None of the barriers mentioned by Pigou are beyond the control of society. A fourth exists, however, which may not be removable. This consists of possible biological factors favoring some occupations to the disadvantage of others. For instance, it may be impossible to remove enough farmers to better-paid occupations, for the reason given by Stuart Chase [11: 102][2]:

> Farming is a career, not a business. Its roots are very ancient and run profoundly deep. In the face of plowed earth, flowing stream, hillside, meadow, orchard, woodland, all the figures which I have spread upon the record suddenly grow dim. What are index numbers and profit and loss accounts when the mighty Isak, that barge of a man, heaves his crowbar under a boulder in the Growth of the Soil?

The teaching of little children may forever remain the work of women partly because of sex differences in appropriate traits, but there is at least room for doubt that these differences are altogether innate. In so far as such biological factors finally remained, the measurement of their economic effect to the favor or the disfavor of certain occupations would call for empirical studies having for their purpose the determination of the proper differential to be subtracted from, or added to, the wage determined by natural scarcity values. Another consideration of this nature is whether the work of society might demand native ability in proportions different from those in which it actually occurs. It is possible that at present we demand twice as many persons of Army Alpha intelligence E as there are persons possessing only this limited ability. There seems to be reason to believe, however, that this condition, if it exists, would only indicate the need for further mechanization of tasks requiring only low ability, presumably of a routine nature. The great majority of occupational requirements would probably fall within the limits of mediocre intelligence, and it is likely that the most permanent discrepancy between existing degrees of ability and occupational needs will continue to be in the higher levels, since, if the production system is admitted to exist only for the service of consumption, society can hardly be conceived as not having use for all its higher intelligence.

TEACHING AS AN ESSENTIAL SERVICE

One further question remains, which relates to the element of demand previously referred to. Since teaching is to be the object of this study, the question arises whether there may come about a change in the demand for this service. This question can be answered on the basis of the economic need for occupational mobility. The removal of all barriers to free occupational mobility—at least those that are adventitious rather than biologically founded—is the task of education. Teaching is an essential service in this purely economic sense. It is true that a failure of actual demand for teaching, due to a failure to recognize its economic significance, is in itself an economic force. In the light of the general social needs just discussed, it seems unquestionable that any existing lack of demand for educational services should become the object of effort by society as a whole for its removal. Such an effort itself becomes an educational service soundly based on the economic needs of the whole social group.

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[2] Quoted by permission of Albert and Charles Boni.

THE ECONOMIC FAIR WAGE

A review of this chapter shows that the criterion of a fair wage has become wholly economic. By this criterion a fair wage becomes one that contributes a maximum amount toward the largest social dividend. This result has been shown to be achieved when all occupations requiring equally scarce natural ability are paid equally. The immediate application is that the fair wage for teaching would be the amount that would be paid to any occupation requiring native ability equal to that required for teaching, if all such occupations were paid at an equal rate.[3]

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[3] In dealing with the theory of this chapter the reader may find profit in referring to Chapters I and IV of *Economic Theory and Correct Occupational Distribution* by Harold F. Clark. [12: 1–3; 57–69.]

CHAPTER IV

THE OPTIMUM DISTRIBUTION OF INCOME

RELATION OF INCOME DISTRIBUTION TO ABILITY

If all occupations are paid on the basis of marginal equality in accordance with native ability demanded for the work, the curve of distribution of earnings will tend to take a shape similar to the curve of ability, provided barriers are removed to allow workers to move out of low-wage, or low-ability, groups. It must be borne in mind that what calls out a given wage under the operation of economic forces is not the ability, but the scarcity of the degree of ability, in question. From a purely economic point of view, what society pays for in a system of perfectly free competition is not ability, but scarcity of that ability. This fact is basic, and it makes us turn our backs on the old individualistic conception of the productivity theory of wages. Productivity has a social dimension expressed in demand. This factor in productivity is measurable only in terms of scarcity. This fact obviates the necessity of defining ability precisely. However ability may be defined, as long as education or socially controllable factors are ruled out, it will be distributed "normally." It follows that the distribution of rewards for varying degrees of such ability will, in a condition of perfect competition, approximate the curve of normal probability. This must be so, unless all that has been learned about variability of inherent traits in man is false.

The position just stated has a considerable degree of support in the work of Professor H. L. Moore, as set forth in Chapter IV of his *Laws of Wages* [35: 71]. In this chapter he describes his statistical verification of the theory in a report of the French *Office du Travail* on wages from 1893 to 1897, which makes a statement translatable as follows:

> The relative value of the wage depends essentially upon the scarcity of the intellectual and physical aptitudes required in the worker, to the ex-

> tent of development of such aptitudes that is demanded by the various occupations.

Moore constructs a theoretical curve of wages, based upon the Gaussian curve of probability. His theoretical curve, when compared, by means of the Pearsonian test, with the smoothed curve of actual statistics of wages, fits perfectly. The same result was obtained in the case where the actual distribution of wages was skewed, as well as in the case where the curve was normal in form. What must be mentioned is the essential fact that although he was working with the wages of laborers of various degrees of skill, there was an approximation of free competition in that those who were working for daily and weekly wages had had about equal chances to acquire varying degrees of efficiency. Moore had full justification for his final statement [35: 91]:

> The fact that the smooth curve of the actual data is practically congruent with the smooth curve of the Standard Population (his theoretically constructed curve of laborers) shows that in this particular case a doctrine of pure economics is statistically verified. . . . The words of the French report are now the actual description of an economic law.

On the basis of these facts, the conclusion advanced at this point is that under conditions approximating perfect competition, that is, perfectly free occupational mobility, rates of payment throughout all occupations would tend finally to conform to the curve that generally describes the distribution of inherent characteristics, that is, the normal probability curve. Additional evidence of the general truth of this statement will be found in Chapter VII, in which curves of income distribution, constructed theoretically, are compared with curves of actual distributions. At this point it becomes necessary to consider for a moment the significance of the statement made above—that the factor that operates to bring about this distribution of income is not the ability in question; it is the scarcity of the various degrees of the ability demanded by the occupations. When all socially controllable factors are ruled out, ability will tend to reduce itself to some form of intelligence. This is true to some degree even if ability is described as the capacity to earn varying amounts.

It becomes more nearly true as we approach in our definition the capacity to contribute to social welfare. Thorndike [56: 362] and Terman [54: 473] have given evidence of the fact that other socially desirable characteristics are correlated positively with intelligence, as it has so far been measured. This correlation would indicate that in addition to such effect as native intelligence itself might have, an additional effect would accrue from the contribution of native intelligence to the acquisition of traits that can be taught or socially induced.

If the foregoing statements be accepted, it follows that the general economic welfare will be best served when the total incomes of all occupations are distributed along a curve of normal frequency in the order of degrees of native intelligence required for the representative occupations, and that any given occupation receives, on the average, the income falling at the point or in the range indicated by the degree of intelligence demanded for that occupation. It would, of course, be more desirable if we knew more about native intelligence and such degrees of potential emotional refinement as are innate. We could then proceed to measure with far greater accuracy the demands made of individuals within an occupational group at levels of varying importance and influence, and our economic criterion could be extended to individuals—an attempt that the crudeness of present measures precludes.

On the whole, however, considering the fact of the greater amenability of emotional factors to social control, the relative scarcity of intelligence, as already measured, seems secure enough for the approximate determination of the relative rates of pay for various great occupational groups. What the highest economic welfare of the social group demands is that somehow we contrive to bring our existing curve of income more nearly in line with the known facts of human variability. For this purpose the measurement of intelligence, as already accomplished, would provide a vast improvement over the present system of income distribution. In the absence of general social planning, what has happened has been the intensive non-social planning of self-seeking groups who have contrived, or whose ancestors have contrived, to seize, by some kind of force, positions of control. In this process the principle of individual economic liberty has been glorified, but thus far economic liberty has been confined to too few individuals. In the sense that its complete theory has not been put into practice, capitalism, as has been said of Christianity and democracy, has never been tried.

DEMAND OF ECONOMIC WELFARE FOR INCLUSIVE DISTRIBUTION

At this point the question must be raised as to the kind of incomes to which normal distribution must apply. Pigou calls attention to the fact that actual incomes are not distributed normally throughout society, as Moore found to be the case in a limited and relatively homogeneous group. Pigou's explanation of this fact is that *inherited* income is never normally distributed. Furthermore, inherited income tends to increase the facilities of its beneficiaries for training. A minor fact is a possible lack of economic homogeneity between manual and mental workers as to productiveness. This last consideration is of no theoretical importance except as there may be real differences in the demand for the services of mental and manual workers. From the social point of view, relative productiveness is measured in relation to demand. In a machine civilization the difference between mental and manual worker tends to disappear as tools multiply. The only remaining difference becomes the continuous variability of native intelligence.

Our quantitative criterion of total economic welfare takes no account of who happens to be in possession of inherited wealth or of what amount he holds. It demands only that all income be included in the optimum distribution. Any fraction, such as earned income, would fall short of mass social return, although the "fair" distribution of even such a fraction would be a step in the right direction. Large, closely held blocks of capital can seek direct outlet only in the further stimulation of production, which already outruns consumption in an unplanned machine economy. Such holdings contribute less in the aggregate to satisfy wants than if they are distributed among greater numbers. If they were distributed more widely, a larger share of these funds would be used to increase consumption and thus to balance economic processes.

> If income is transferred from rich persons to poor persons, the proportion in which different sorts of goods and services are provided will be changed. Expensive luxuries will give place to more necessary articles, rare wines to meat and bread, new machines and factories to clothes and improved small dwellings; and there will be other changes of a like sort. [p. 98]
>
> We must not hesitate, therefore, to conclude that, so long as the dividend as a whole is not diminished, any increase, within wide limits, in the real income enjoyed by the poorer classes, at the expense of an equal decrease in that enjoyed by the richer classes, is practically certain to involve an addition to economic welfare. [p. 98]

If Figure I in Chapter III is again considered, it will be understood that high income groups, such as *J* and *K*, are presumably contributing at some point near their maximum of direct consumption, while the lowest, such as *A*, *B*, and *C*, are pretty close to a bare subsistence level. Transferring *A* or *B* to higher income groups involves bringing new consumption power into the market. To the degree that high earnings are reduced in this process, such subtractions are much more likely to be made from surplus incomes that previously flowed directly into productive enterprise by way of reinvestment.

At a time in history when large individual holdings of wealth were the only source of funds for the financing of production, it could be argued that such holdings were a necessity; but this is no longer the case. The savings of workers whose wages furnish relatively small surpluses over bare subsistence, in insurance, saving funds, and share holding are eloquent testimony that the poor as well as the rich can save for productive purposes. Given sufficient surplus, they will supply all the capital necessary. In our present corporate life we have organized means for gathering large amounts from individually small capital sums. The administration of such funds increasingly tends to become a professional service. These are trust funds, and administration of them, if it is to maintain confidence, must seek stable earnings. Such a professionalized financing service must inevitably tend to apply funds to production where they are needed, rather than to apply them according to individual caprice or to the desire for speculative profits.

It is true that this tendency can go too far. No economic system, and least of all one on a competitive basis, can obviate risk, and many large social values are to be attained only by undertaking risk. Such ventures as the opening of new mining fields or the financing of a theatre, for instance, involve a large speculative element, but even in these cases specialization in financing, greater knowledge, and the spread of risk are not incompatible with the financing of production by a kind of professional financial engineer. In his Appendix, Pigou discusses with some thoroughness this question of uncertainty and the means of financing risk. One of the points he makes is that in the main such risks should be taken by the wealthier members of society because losses in satisfaction attendant upon given losses of money are less in the case where the amount lost is a small share of one's total wealth. In the period yet to pass before we attain a measurable approximation of normal distribution of incomes, such risks may be appropriately referred to holders of inherited wealth.

There are prospective values of an important nature in the increase of the number of small shares of capital ownership. Growth in this direction would promote stability by giving a larger number of people a recognized stake in the economic system. Social health, efficiency, and economic productivity, as well as large individual gains, would be promoted by the increase in personal security due to the holding of surplus capital funds by a large number of people.

NORMAL DISTRIBUTION OF UNEARNED INCOME

A movement toward a normal distribution of *all* incomes would shift the economic burden of proof from the wage earner to the collector of unearned income. Pigou notes the crucial position of unearned income in inequalities of distribution.

> Nor is it necessary to imagine so large a change as the destruction of inheritance laws, in order that the form of the income-curve may be largely affected. There is ground for believing that a like result would come about in consequence of anything that affected, in a marked way, the proportion between "earned" income and income derived from investments. [p. 650]

A tendency toward fair incomes based on such a curve would cause profits to flow off in increased earnings to the lower wage groups. Such a movement could be "speeded up" only by social consciousness of its desirability. These lower groups have advanced but slowly; they have been the last to be benefited by technological advance. New technology has the immediate effects of raising dividends and of removing wage earners from the pay roll. The adjustment for the wage earner occurs, if at all, only at a later time in lowered prices. This happy result usually comes about after a considerable share of the improved earnings has been stowed away in increased reserves or enlarged plant, or wasted in competitive advertising.

The lower income groups have lost ground in comparison with those at higher levels. This fact has tended to be obscured by very great advances made in a few highly skilled trades that are carefully protected by entrance rules. It has even been obscured by incomplete interpretations of the findings of students of wage movements.

In the concluding chapter of *Real Wages in the United States*, Professor Paul Douglas [18] gives tables and charts showing the relative share that labor as a whole received from the net product added to materials by the manufacturing industries from 1899 to 1925. Because this total fraction going into wages and salaries indicates a net rise for the whole period, he makes the following statement:

> If we take the material as a whole, therefore, and consider the value product of industry and not merely the physical product, it seems impossible to conclude that the share of labor has decreased during the quarter-century from 1899 to 1925. The evidence indicates instead, that labor's share increased from 1899 to 1921, and that while it has decreased since then, it was in 1925 still above the average of 1899.

In considering this statement, two points need to be made. The first, noted by Douglas, is that the total share of labor has fallen with some sharpness since 1921. While the period since 1921 is too short for the conclusion that this fall is a definite change in great trends, it is worth while to note that this is just the period in which the gain in total national income has been most sharply accelerated. On page 100 of *The National Income and Its Purchasing Power* [26], King gives a table showing estimates of total national income in 1913 dollars from 1909 until 1928. In the thirteen years from 1909 to 1921, inclusive, the total income rose approximately five and a half billion dollars. In the eight years since 1921, the similar rise has been seventeen and a third billion dollars. It is at least possible that this more rapid growth in the later period may be tending to leave labor behind in the sharing of its fruits. In the second place, Douglas's figures give us no answer to the question of how the *individual* in the lower-paid groups has fared in comparison with the enterpriser and the owner. It is possible to get from King's estimates an approximate answer to this question. The following comparison has been worked out from various estimates of total shares of the national income and from the numbers of individuals dividing these shares [26: 56, 60, 62, 108, 122.]

COMPARISON OF REAL GAINS OF WAGE AND SALARY EARNERS WITH THOSE OF ENTERPRISERS AND PROPERTY OWNERS

	1909	1925
Number of Wage and Salary Earners	24,410,000	33,847,000
Share of National Income	$15,946,000,000	$46,855,000,000
Average Individual Income	$653	$1,384
Index (1914=100)	87	173
Average "Real" Income	$750	$800
Number of Enterprisers	9,845,000	9,997,000
Share of National Income	$14,515,000,000	$35,076,000,000
Average Individual Income	$1,474	$3,508
Average "Real" Income	$1,694	$2,028
Increase—Average Wage and Salary Earner		7%
Increase—Average Enterpriser		20%

This result, after making allowance for profits paid to bondholders and shareholders who are not "gainfully occupied," shows at least a very strong presumption that the individual wage earner has been losing, as compared with the individual profit taker and rent taker.

The improvement of small incomes in relation to large incomes would, of necessity, put large incomes on the defensive. Every group income now below the mean of an ideal distribution would, if moved up, include some contribution from incomes now above the mean. If the ideal distribution, which furnished the criterion for the direction and limit of these movements, were based upon all incomes, the attrition of large unearned incomes would necessarily begin. Wide publicity for statements of unequal incomes of various occupational groups would just as surely constitute an effective attack on inherited wealth as proposals to impose large inheritance taxes. The attack would be increasingly effective as new figures for ideal incomes were issued from time to time upon the basis of newly achieved total national income. This attrition of inherited wealth would be the source of a surplus of wages over the bare subsistence level—a surplus that would allow the wage earner increasingly to share in capital holdings. Unearned income would not disappear; it would, however, gradually become more widely distributed.

As a result of the more "normal" distribution of capital ownership, new consumption power would be created in enormous amounts. The brakes would be removed from production, which is proceeding at about half its potential rate at present.

> Engineers agree that production is only half efficient with present equipment, with undreamed of gains still to come from invention and research. With incentive our agricultural output could easily be doubled, or even quadrupled. So far as science and engineering are concerned, we could readily produce an abundance for our entire population, enough to remove all economic need for the labor of adolescents and the aged. Few realize how close to our reach is the abolition of poverty; the problem in the way is one of reorganizing distribution and in the use of capital. [67: 263][1]

> At this very moment from 40% to 60% of the energy and capacity of our American Frankenstein is idle and is straining at the gears to "go." [21: viii][2]

With productive capacities freed, invention would cease to be held in check by fear of further unbalance, and would respond naturally to the stimulation of new demands. The use of total income in the basic curve of ideal distribution would maximize the contribution of the factor of distribution toward realizing potential productivity in the present state of technology.

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[1] Quoted by permission of Longmans, Green & Co.

[2] Quoted by permission of The Business Bourse.

A normal distribution of present income would indicate incomes for all groups that are but half what they would actually be with an ideal distribution and with existing production equipment. The improved condition would come about through raising consumption power to a maximum, and thus balancing production. The achievement of something like balance of economic activity would mean the beginning of an unexampled expansion of technology. Such a movement would initiate a growth in the flow of goods that would make impossible the setting of any certain limitation upon the real income of any or all groups.

The point of attack in a campaign for the achievement of such general conditions is the effort to determine for specific occupational groups their economic fair wages. Pigou says:

> The procedure, which, if practicable, would most advantage the national dividend, would be to examine and deal separately with every place or occupation where there was *prima facie* reason to believe that wages were unfair in any of the senses studied in the text. [p. 570]

It is from this point of view that the study proceeds in the following chapters to examine the teacher's wage and to apply the criterion of maximum social dividend obtained by normal distribution of all income.

CHAPTER V

THE INTELLIGENCE OF TEACHERS

THE problem of this chapter is to arrive at the natural scarcity value, in the general population, of the degree of intelligence demanded of our present grade teachers. A scientific procedure would demand the measurement of a considerable number of teachers actually in service, so chosen as to be truly representative of the whole group, and a like measurement of the general population, fairly sampled as to geographical, social, racial, and occupational distribution. The groups in both cases would have to be large enough to yield a respectable statistical reliability. In meeting these needs, we fail at a number of points. We have no measures of teachers in service, nor have we a thoroughly satisfactory measure of the general population. The available results of measurement that come nearest to meeting the need and that give promise, upon proper treatment, of yielding reasonably good estimates, are those growing out of the use of the Army Alpha test during and after the World War. The use of this test represents the only attempt that has so far been made to measure the population directly in large numbers. To the extent that it has been used to give a measurement of teachers, this test gives some promise of direct comparison.

LIMITATIONS OF THE I.Q. TECHNIQUE

The only other attempt to establish a measuring scale against the general population is the work of Terman in standardizing the Stanford Revision of the Binet Scale [53]. Terman's method, however, has two serious limitations that bar it from use in the present study.

First, it is a method that is applicable only to children during the period of growth and cannot safely be transferred to adults. It is essentially a comparison of growth rates of individuals with those of the typical, or average, individual. The direction and rates of growth of adults have not yet been so thoroughly investigated as to allow the use of the I.Q. technique with security.

Second, Terman used for his standardization a group which was distinctly unrepresentative of the general population. His main sample consisted of a thousand children from cities of moderate size in California and Nevada. Two-thirds were from California. The median Alpha score for men in the Army from California was 78.1 [67: 681, Tables 200–206]; that of Nevada was 64.4. These scores are to be compared with the median for the entire white draft who took the Army Alpha test, which was 61.25. California ranks third among the forty-five states, for which there were more than one hundred Alpha scores [67: 455]. Nevada, although it had fewer than one hundred Alpha scores, would fall in sixteenth place among the states. Both these states are in the western group, which was found by Miss Cobb [14] to be the highest of the seven regions into which she divided the country according to Alpha intelligence of the draft and of medical officers. These facts are offered as evidence of the relatively high positions of both these states in the country as a whole as to the intelligence of their inhabitants. Terman consciously excluded the foreign born and limited his group largely to north European origins. Whatever may be said for racial differences in intelligence, here certainly were many selective factors of at least social and economic character tending to make his group unrepresentative. He had no Negroes, no dwellers in metropolitan ghettos, no recent southern and southeastern European immigrants. Rather than being representative of the existing American population in general, this group would seem to represent an attempt to select what Terman considered the *desirable* American average. The result of this procedure was the standardization of the Stanford Revision at too high a level. This error was indicated in 1914 by Thorndike [57].

In 1923 Symonds [51] added further evidence to support this conclusion. By taking the census occupation groups in combination with the intelligence ranges discovered for these groups in the Army tests, he worked out statistically an estimated general population curve of intelligence for the country as a whole. He promptly discovered the fact that Alpha has two major limitations. It does not measure the lower intelligence groups at all, and it does not measure discriminatingly or in equal units the higher ranges. His solution was an extension of the Alpha scale, by statistical methods, to one hundred points below zero and to some fifty points above 212. This upper extension agrees with Thorndike's conversion of Alpha into a scale of equal units, a scale which he extends to include 249 [55: 238]. The distribution based on Thorndike's extended Alpha scale was used by Symonds to support his conclusion that Terman's mental age norms were too high.

THE COMBINED SCALE DERIVED FROM ARMY TESTS

In dealing with the entire population group as a background for the measurement of teachers, the present study faces the limitations of Alpha. For the present purpose it is not necessary, however, to make fine and precise discriminations in the upper ranges of intelligence. It is desirable that we have tests for this purpose, and such tests will be necessary if the method described in this study comes to be of general use. The Thorndike test is probably the most accurate for this purpose. In a very widespread general use in determining the intelligence of occupational groups, a test is needed that will be easy to give and economical of time, and that will correlate almost perfectly with the more thoroughgoing tests. What is desired in the present study is to determine with a fair degree of accuracy the relative position in the whole population group of an occupational group that, presumably, is not at the top.

The Army Alpha test does not measure the lower ranges of intelligence. This was indicated graphically by the piling up of the frequencies at the lower end of the scale in the Army testing. In failing to measure illiterates and those of low grade intelligence, Alpha fails in itself to give a measure of the general population. For this reason the Combined Scale, worked out under the direction of Boring and Brigham [67: Part III, Chap. II] from the Army Alpha, Beta, and Mental Age scores, will be used throughout this study. In the case of certain groups the Alpha scores will be given. This will give an opportunity for checking the accuracy of citations of original data. It will also help in effect-ing a shift in the reader's thinking from Alpha to the less familiar Combined Scale and will furnish one or two opportunities for checking the accuracy of the converted scores. The method of conversion was to distribute all Alpha frequencies according to Table 159 on page 642 of the *Memoirs* [67]. Wherever frequency tables are available, they have been converted into Combined Score frequencies by means of this table, and statistical treatment has been applied to the Combined Scale frequency tables.

In order, however, to be able to transmute a single Alpha score or median into an approximately equivalent Combined Scale score, the portion of this table that indicates a linear relationship was used to work out a product moment r. Only the extreme top and bottom, which are not necessary for the purpose, had to be omitted. The r obtained was .95, which agrees with the correlations used by Boring and Brigham to construct their table [67: 641]. Transmuted scores achieved by converting Alpha frequencies into Combined Scale frequencies are highly accurate. Single scores obtained by using the regression equation based on $r = .95$ are less accurate, but they do not materially increase the unreliability inherent in the Alpha test. In the case of frequency distributions, there are thus two ways of arriving at central tendency figures. This will be demonstrated in the case of the main sample of teachers in training, and the amount of disagreement between them will be shown.

The regression equation was used to construct Table I, which gives for any Alpha score its approximately equivalent Combined Scale score, to two places. As a matter of convenience, the percentile position in the general population for each score is included in this table. These percentile ranks were computed from the mean and standard deviation of the Army principal sample given in Table V (p. 50). The mean of this sample corresponds to an Alpha score of 53. Professor Thorndike and his staff [8] have constructed a table of percentile ranks that is approximately 1 per cent above those given in this table. They used men of the white draft and officers in the ratio of 20 to 1. This sample gave a mean of approximately 61. The Army sample used here includes, in addition to men of the white draft, men of the colored

Conversion of Army Alpha Scores into Units of the Combined Scale (Mental Age), and Percentile Ranks in the General Population

Alpha Score	Combined Scale	Percentile Rank	Alpha Score	Combined Scale	Percentile Rank	Alpha Score	Combined Scale	Percentile Rank	Alpha Score	Combined Scale	Percentile Rank
200	22.60	99.36	162	20.28	96.71	124	17.96	88.49	86	15.65	71.57
99	22.54	99.32	61	20.22	96.64	23	17.90	88.30	85	15.59	70.88
98	22.48	99.29	160	20.16	96.49	22	17.84	87.90	84	15.52	70.19
97	22.42	99.27	59	20.10	96.33	21	17.78	87.49	83	15.46	69.50
96	22.36	99.22	58	20.04	96.25	120	17.72	87.29	82	15.40	69.15
195	22.30	99.18	57	19.98	96.08	19	17.66	86.86	81	15.34	68.44
94	22.23	99.13	56	19.92	95.99	18	17.60	86.43	80	15.28	67.72
93	22.17	99.11	155	19.86	95.82	17	17.54	86.21	79	15.22	67.36
92	22.11	99.06	54	19.79	95.64	16	17.48	85.77	78	15.16	66.64
91	22.05	99.01	53	19.73	95.45	115	17.42	85.31	77	15.10	65.91
190	21.99	98.98	52	19.67	95.35	14	17.35	85.08	76	15.04	65.54
89	21.93	98.93	51	19.61	95.15	13	17.29	84.61	75	14.98	64.80
88	21.87	98.87	150	19.55	94.95	12	17.23	84.13	74	14.91	64.06
87	21.81	98.81	49	19.49	94.84	11	17.17	83.89	73	14.85	63.68
86	21.75	98.78	48	19.43	94.63	110	17.11	83.40	72	14.79	62.93
185	21.69	98.71	47	19.37	94.41	09	17.05	82.89	71	14.73	62.17
84	21.62	98.64	46	19.31	94.29	08	16.99	82.64	70	14.67	61.79
83	21.56	98.57	145	19.25	94.06	07	16.93	82.12	69	14.61	61.03
82	21.50	98.54	44	19.18	93.82	06	16.87	81.59	68	14.55	60.26
81	21.44	98.46	43	19.12	93.57	105	16.81	81.33	67	14.49	59.87
180	21.38	98.38	42	19.06	93.45	04	16.74	80.78	66	14.43	59.10
79	21.32	98.34	41	19.00	93.19	03	16.68	80.23	65	14.37	58.32
78	21.26	98.30	140	18.94	92.92	02	16.62	79.67	64	14.30	57.53
77	21.20	98.21	39	18.88	92.79	01	16.56	79.39	63	14.24	57.14
76	21.14	98.12	38	18.82	92.51	100	16.50	78.81	62	14.18	56.36
175	21.08	98.03	37	18.76	92.22	99	16.44	78.23	61	14.12	55.57
74	21.01	97.98	36	18.70	92.07	98	16.38	77.94	60	14.06	55.17
73	20.95	97.88	135	18.64	91.77	97	16.32	77.34	59	14.00	54.38
72	20.89	97.78	34	18.57	91.47	96	16.26	76.73	58	13.94	53.59
71	20.83	97.67	33	18.51	91.31	95	16.20	76.42	57	13.88	53.19
170	20.77	97.61	32	18.45	90.99	94	16.13	75.80	56	13.82	52.39
69	20.71	97.50	31	18.39	90.66	93	16.07	75.17	55	13.76	51.60
68	20.65	97.44	130	18.33	90.32	92	16.01	74.86	54	13.69	50.80
67	20.59	97.32	29	18.27	90.15	91	15.95	74.22	53	13.63	50.40
66	20.53	97.19	28	18.21	89.80	90	15.89	73.57	52	13.57	49.60
165	20.47	97.13	27	18.15	89.62	89	15.83	73.24	51	13.51	49.20
64	20.40	96.99	26	18.09	89.25	88	15.79	72.57	50	13.45	48.40
63	20.34	96.86	125	18.03	88.88	87	15.71	71.90			

draft and of the development battalions in about the same proportions as such men occur in the general population. This sample probably gives a more accurate mean for the whole population. These groups are unmistakably present in our population, and there seems to be no reason for excluding them in the construction of a table of percentile ranks.

The units of the Combined Scale can be thought of without serious error as Mental Age scores if two precautions are observed. First, the Mental Age is an accepted unit of measurement, but one that is, after all, arbitrary rather than descriptive, and fully interpretive of an intelligence test score. Second, the Mental Age is based upon Terman's standardization, which has been called into question in the previous discussion. These precautions perhaps amount to the same thing: the Mental Age lost its concrete meaning because it failed to justify that meaning, but it has been retained as a useful abstraction.

REPRESENTATIVE TEACHER GROUPS

Teachers in Service

The attempt will be made to place in the general population but a single teacher group. For this purpose the elementary grade teacher has been chosen because in many ways she is the best known and most characteristic type of teacher. She is also a member of the most numerous group. By elementary grade teacher is meant one who does full-time classroom work in any grade or combination of grades from kindergarten to eighth grade, inclusive.

Teachers, as treated in this study, are considered to be workers with some training beyond high school graduation. The least training which is cited is that in the Ohio County Normal Schools, which is one year beyond high school graduation. The question should be raised, Can the intelligence of teachers in general be estimated without some measurement of those of less than this amount of training who constitute about half the elementary teachers of the country [20: 301]? No especial note is made of them for the following reasons:

1. The data used in this study show teachers in general rang-

ing down to the mean intelligence of the general population, which is far below that necessary for successful completion of high school. Graduation from high school requires intelligence in the top 30 per cent or so of the population. The intelligence of the lower groups is probably well represented by the lower figures included among those shown. The 1,571 students of the Ohio County Normal Schools who yield an Otis score equivalent to 15.95 on the Combined Scale are probably representative of the lower intelligence ranges among teachers. The population mean is 13.60, and the mean for superior high school seniors is 18.11.

2. There is probably a minimum of intelligence, as judged roughly by employing authorities, which operates in the selection of untrained teachers so as to reduce to a minimum the number of those below the average level of the population. When it is recalled that what is being dealt with here is native intelligence, it will be seen that the lack of professional training does not necessarily mean that the lower levels of intelligence come freely into teaching. On the other hand, it must be noted that the selection due to organized agencies for training is, in general, ineffective and that the absence of definite standards does materially lower the level of intelligence in the teaching ranks for the country. This latter factor will have to be taken into account in the final use made in this study of the intelligence found for teachers.

3. The accepted standard of two years or more of professional training for teachers is gaining so rapidly in practice that the teacher of the immediate future may be thought of as having two, three, or four years of training beyond the high school. No planning that looks to the future should be based upon the undertrained workers still in the ranks. Conclusions will apply only to teachers of at least two years of training beyond high school.

Intelligence test results for large groups of teachers in service are exceedingly rare in the literature. Only one complete distribution has been found by the writer. This is a table of Alpha scores of 399 teachers actually at work in the southern sections of Ohio, who attended the extension courses given by Professor P. L. Morton about the year 1920. These data are given by W. B. Bliss [7: 34], who does not indicate any other published report.

This distribution is shown under the heading of Teachers in Service in Table IV. The Alpha median for this group is 136.6. Madsen [30] refers to the testing of 230 elementary teachers in Omaha, Nebraska, who yielded an Alpha median of 140. Morton is reported by Bliss to have got a median of 148 for thirty-six teachers in Logan, Ohio. The smallness of this number may mean some type of selection working to produce the higher median. No attempt is made at this point to settle the question as to whether this group of 399 teachers is a fair sample of teachers in service. An examination will be made of a much larger group of teachers in training, with a view to the possible establishment, through these related data, of the representativeness of this small group.

Teachers in Training

On page 870 of the *Memoirs* [67] Yerkes reports results from twenty colleges for men, from thirteen colleges for women, and from seven normal schools. These institutions are, according to Yerkes, "largely the smaller schools and colleges from the west and south"; and in another place he says, ". . . there are large differences between normal schools as well as between colleges." This latter fact has been shown to be true in the case of every test that has been applied to students in higher institutions. It may be noted later in this report in the facts given for the Alpha, Thurstone, Otis, and Thorndike tests. It is unlikely that Yerkes believed any of his college and normal school distributions to be truly representative. He goes on to say that more complete results would probably show higher medians. At later points in this report data will be given from other colleges and normal schools that will assist in answering the question of whether the Yerkes groups are fairly representative. His total distribution is included here, in Table II, with three other fairly large distributions to make the combined distribution, totaling 4,204. This will be the sampling of teachers in training offered in this study as representative of freshmen in normal schools. The four distributions follow: Five hundred eighty-four students of the normal school at Cape Girardeau, Missouri, of whom 77 per cent were freshmen. These were reported by Benson [6]. The second

TABLE II

Distribution of Army Alpha Scores of 4,204 Students in Normal Schools

Alpha Scores	(1) Cape Girardeau, Missouri	(2) University of Southern California, Teachers College	(3) Kalamazoo, Michigan	(4) Seven Normal Schools, West and South	Total
209–212...	..	..	..	..	..
200–209...	..	1	..	..	1
190–199...	1	2	4	3	10
180–189...	3	17	28	4	52
170–179...	7	64	41	14	126
160–169...	21	123	100	12	256
150–159...	29	201	145	34	409
140–149...	54	238	194	52	538
130–139...	65	273	200	63	601
120–129...	61	250	185	91	587
110–119...	100	193	122	100	515
100–109...	80	142	86	90	398
90– 99...	49	94	61	72	276
80– 89...	56	53	18	67	194
70– 79...	32	31	10	53	126
60– 69...	17	9	4	30	60
50– 59...	6	4	1	20	31
40– 49...	3	1	..	10	14
30– 39...	..	2	..	6	8
20– 29...	..	..	..	2	2
Number..	584	1,698	1,199	723	4,204
Per Cent of Freshmen	76.7	100.0	93.1	100.0	94.6
Median...	115.4	131.0	135.6	111.0	128.2
Mean.....	115.5±3.33	131.2±1.90	134.9±2.04	110.2±3.39	126.5±1.26
S.D.......	27.2	26.2	23.6	30.5	27.4

Reporters:
Column (1) Benson
Column (2) Waddell } —Used by permission of Warwick and York.
Column (3) Renshaw—Used by permission of Public School Publishing Co.
Column (4) Yerkes—Used by permission of U. S. Government Printing Office.

group consists of 1,698 freshmen students of the University of Southern California Teachers College. These were reported by Waddell [64]. The third is a group of 1,199 students of the normal school at Kalamazoo, Michigan; 93 per cent of these were freshmen. These were reported by Renshaw [50]. Along with these, Yerkes's group is the fourth. The inclusion of the Teachers College group of the University of Southern California among normal school freshmen may require some defense. The first reason is that the majority of these students were destined to become grade teachers. In the second place, the median for this group is somewhat less than that for Kalamazoo. It is also smaller than that for St. Cloud and for eight normal schools of Minnesota, whose medians are given in Table III (p. 48). In view of the fact that some of the lowest figures from teacher-training institutions are probably included in the whole sample, it seems fair that about the same number of the more fortunate institutions be used. An examination of Table II will probably justify the opinion that the whole range of ability groups in normal schools is fairly represented. The question of whether these groups are presented in fair proportions is one that is very difficult to answer. An attempt to find one kind of answer will be made in the following paragraph.

This sample of 4,204 already represents six or seven states, all but one of which are in the West and South. Medians are available for a number of other institutions which raise the total number of cases to 6,554. This larger group of schools represents somewhat more than eleven states, and to some extent it represents bordering states. These are scattered over the country west of the Mississippi, and include, in the eastern section, Pennsylvania, Illinois, and Ohio. This larger list of schools begins to approximate what may be accepted, from a common-sense point of view, to be a representative sampling of the geographical sections of the country. There are included normal schools of admittedly low standing in their power to attract high intelligence. There are included also normal schools of average and high standing.

Three collegiate schools of education are included, forming altogether about one-third of the entire group. Many of the students of these institutions were later to teach in the grades. It is difficult to get any information concerning the proportion of elementary school teachers who have attended institutions of collegiate grade. Lynd [29: 207] found in Middletown in 1923–24, among 268 teachers, principals, and supervisors in the elementary schools, academic degrees distributed as follows:[1]

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[1] Used by permission of Harcourt, Brace and Company.

Academic Status of the Elementary School Teachers in Middletown

56 have college degrees
8 have college diplomas
3 have college certificates
30 have normal degrees
26 have normal diplomas
33 have normal certificates

If approximately twenty of these were principals and supervisors, about one-third of the elementary school teachers had completed courses in degree-granting institutions. Norton [40: 206] found in 1927–28 that about 10 per cent of cities of all sizes were requiring three years of training beyond high school for new teachers, and that more than 1 per cent of four groups of cities out of six were requiring four years of training. When account is taken of the effect of the trend toward the single salary schedule and the trend toward increased training for elementary school teachers, especially in the sections of the country where these higher schools are located, it is perhaps not unreasonable to include the Teachers College of the University of Southern California and the School of Education of Ohio University.

If this group of twenty-four institutions is acceptable as fairly representative of the institutions training elementary school teachers throughout the country, the question is then raised whether Yerkes's group of normal schools is representative, and whether the main sample of Table II is representative. As evidence on this point, the technique of significant differences[2] was applied to the three groups.

The difference of the means of Yerkes's group and of the total frequency distribution of Table II was about thirteen times the standard deviation of the difference—a fact that indicates a significant difference between these groups. This is taken to be evidence for the conclusion that the Yerkes group is not representative of the group in Table II. For the large group including

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[2] Throughout this study the criterion of reliability will be three standard deviations, as recommended by Garrett in *Statistics in Psychology and Education* (p. 133). This more conservative criterion is adopted, rather than the critical ratio, because of the relative unreliability of the Alpha test and the superimposed Combined Scale conversions. This criterion will be applied in determining the reliability of central tendencies as well as the reliability of group differences.

6,554 cases, no measure of variability is available. For this reason it was assumed that the standard deviation, if known, would fall within the limits of reliability of the standard deviation of the included group of 4,204. The standard deviation of the difference of the medians was computed on the basis of these assumed limits. In neither case was there a significant difference. A mathematical proof is given in Appendix A that these two large groups, with their small difference of medians, could not be significantly different. These facts are taken to indicate that the main sample of Table II is representative of the country as a whole if the larger sampling of Table III be accepted as so representative. From this point on, this main sample of Table II with its 4,204 cases is treated as fairly representative, for the country as a whole, of freshman elementary teachers in training.

TABLE III

MEDIAN ALPHA SCORES OF NORMAL SCHOOL STUDENTS FROM MORE THAN ELEVEN STATES IN VARIOUS SECTIONS

SCHOOL	STATE	NUMBER OF CASES	MEDIAN ALPHA SCORE	COMBINED SCALE EQUIVALENT
(1) Cape Girardeau..............	Missouri	584	115.4	17.44
(2) University of South California, Teachers College...........	California	1,698	131.0	18.39
(3) Kalamazoo..................	Michigan	1,199	135.6	18.67
(4) Seven Normal Schools........	Pennsylvania, Nebraska, Texas, West and South	723	111.0	17.17
(1) Bloomsburg.................	Pennsylvania	138	113.2	17.30
(1) Greeley State Teachers College	Colorado	266	121.9	17.84
(5) St. Cloud..................	Michigan	384	134.0	18.57
(6) State Normal University......	Illinois	169	126.0	18.09
(6) Emporia....................	Kansas	231	115.0	17.42
(7) Ohio University School of Education.................	Ohio	382	133.0	18.51
(8) Eight Normal Schools........	Minnesota	780	135.0	18.63
Weighted Median...........		6,554	127.6	18.18

Reporters:
- (1) Benson [6]
- (2) Waddell [64]
- (3) Renshaw [50]
- (4) Yerkes [67]
- (5) Brown [9] *
- (6) Peterson and Kuderna [45] †
- (7) Noble [43] †
- (8) Whitney [65] ‡

* Used by permission of Warwick and York.

† Used by permission of the Science Press.

‡ Used by permission of Public School Publishing Co.

Table II gives the Alpha distributions that make up this group. Table IV repeats the Alpha distribution for the total of these teachers in training, and also gives the corresponding Combined Scale distribution for this group. It will be seen that the median Alpha score is 128.2. The Combined Scale median for the same group is 18.26.[3] The Combined Scale mean for freshman teachers

TABLE IV

Alpha and Combined Scale Distributions of Teachers in Training and of Teachers in Service

Alpha Distribution			Combined Scale Distribution		
Alpha Score	Teachers in Training	Teachers in Service*	Combined Scale	Teachers in Training	Teachers in Service
209–212.........	..	..	25.0–25.9......	..	..
200–209.........	1	..	24.0–24.9......	..	..
190–199.........	10	2	23.0–23.9......	5	..
180–189.........	52	14	22.0–22.9......	42	9
170–179.........	126	12	21.0–21.9......	191	28
160–169.........	256	43	20.0–20.9......	457	62
150–159.........	409	49	19.0–19.9......	749	80
140–149.........	538	61	18.0–18.9......	891	80
130–139.........	601	54	17.0–17.9......	794	60
120–129.........	587	43	16.0–16.9......	549	42
110–119.........	515	42	15.0–15.9......	311	26
100–109.........	398	24	14.0–14.9......	143	10
90– 99.........	276	24	13.0–13.9......	53	1
80– 89.........	194	18	12.0–12.9......	15	1
70– 79.........	126	9	11.0–11.9......	4	..
60– 69.........	60	2	10.0–10.9......	..	..
50– 59.........	31	1	....	..	..
40– 49.........	14	..	....	..	..
30– 39.........	8	1	....	..	..
20– 29.........	2	..	....	..	..
Number........	4,204	399		4,204	399
Median.........	128.2	136.6		18.26	18.74
Mean...........	126.5 ±1.26	136.3 ±4.18		18.18 ±.087	18.63 ±.280
S. D............	27.4	27.9		1.88	1.87

* Reported by Bliss, quoting Morton. Used by permission of Ohio State Dept. of Education.

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[3] By referring to Table I it will be seen that an Alpha median of 128 is equivalent to a Combined Scale unit of 18.21. Reading across to equivalent percentile ranks, it will be found that there is a difference between these two figures, obtained by differing computations, of less than one percentile position. Accurately, the difference is about thirty in ten thousand cases. In the case of the means, the difference is about the same. This is offered as a measure of the reliability of the Combined Scale equivalent obtained from a single Alpha score by means of the regression equation based on Table 159 [67: 642].

in training is 18.18. The mean for teachers in service is 18.63. What do these figures mean in terms of the general population?

INTELLIGENCE OF THE GENERAL POPULATION

The principal Army sample, organized by attempting to secure in representative numbers white officers and members of the white draft, of the colored draft, and of development battalions, is reported on page 654 of the *Memoirs* [67]. It is shown in Table V.

TABLE V

Distribution of Principal Sample of the Army

(Combined Scale constructed statistically from Alpha, Beta, and Stanford-Binet results to give a fair distribution of the population as represented by the Army recruited during the World War) *

Combined Scale	White Draft	Colored Draft	White Officers	Development Battalions	Total
25.0–25.9	..	..	1	..	1
24.0–24.9	6	..	6	..	12
23.0–23.9	15	..	106	1	122
22.0–22.9	122	..	612	3	737
21.0–21.9	437	2	1,648	7	2,094
20.0–20.9	1,000	7	2,522	16	3,545
19.0–19.9	1,787	17	2,836	27	4,667
18.0–18.9	2,953	50	2,698	47	5,748
17.0–17.9	4,580	91	2,155	78	6,904
16.0–16.9	6,634	182	1,454	121	8,391
15.0–15.9	9,050	332	837	175	10,394
14.0–14.9	11,572	607	412	230	12,821
13.0–13.9	14,229	1,132	179	270	15,810
12.0–12.9	13,940	1,776	60	251	16,027
11.0–11.9	10,036	2,283	14	187	12,520
10.0–10.9	6,887	2,662	3	149	9,701
9.0– 9.9	4,770	2,903	1	130	7,804
8.0– 8.9	2,951	2,584	..	102	5,637
7.0– 7.9	1,681	1,953	..	76	3,710
6.0– 6.9	808	1,216	..	52	2,076
5.0– 5.9	333	646	..	28	1,007
4.0– 4.9	122	290	..	15	427
3.0– 3.9	38	110	..	6	154
2.0– 2.9	11	40	..	2	53
1.0– 1.9	3	7	..	..	10
0.0– 0.9	..	2	..	..	2
Total	93,965	18,892	15,544	1,973	130,374
Mean	13.46 ± .028	9.98 ± .058	18.84 ± 0.50	12.71 ± .224	13.60 ± .030
S. D.	2.94	2.68	2.10	3.32	3.62

* *Memoirs of the National Academy of Sciences*, Vol. XV, p. 654.

There has been considerable discussion concerning the validity of the assumption that the Army represented a fair sampling of the general population. A consideration of all the arguments is likely to induce the judgment that the arguments for regarding the sampling as too high tend to cancel those that attempt to prove it to be too low. Whether or not the Army may be taken as a truly representative sample, it is beyond question that the Army testing represents the best measure that we have of the general population. The distribution that is used in this study as representative of the population in the entire country is the combined distribution formed by totaling the four columns on page 654 of the *Memoirs*. This gives a group of 130,000, of which about three-quarters are white draft, one-seventh colored draft, one-ninth white officers, and the remaining small fraction development battalions. This group furnishes a Combined Scale mean of 13.60 with a standard deviation of 3.62. With this mean as a reference point, the mean for the teachers-in-training group falls at 1.27 standard deviations above the mean of the population. The mean for the teachers in service is 1.38 standard deviations above the population mean. Figure 2 shows these relationships graphically. It must be noted that the curves representing the

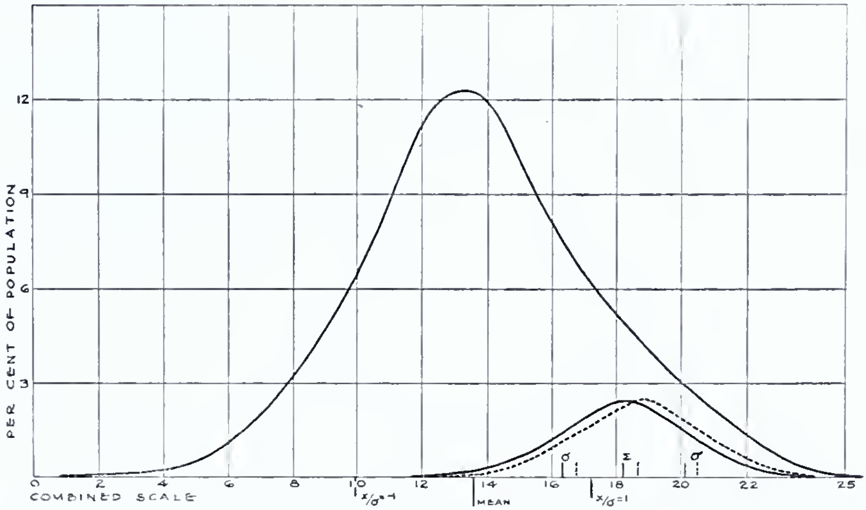

FIGURE 2. Distribution of Intelligence of the General Population and of Teachers in Units of the Combined Scale, Derived from the Army Alpha Examination

two teacher groups are greatly exaggerated in size, and in different proportions, with relation to the curve of general population. This figure shows that both groups are almost entirely above the mean for the population.

By reference to Table I (p. 41), it may readily be seen that the average freshman teacher in training, with her Combined Scale score of 18.18, is exceeded in intelligence by 1,038 persons out of every 10,000 of the population.[1] To the extent that the group used accurately represents teachers in service, the teacher in service at the mean for her group is exceeded by 823 out of every 10,000 of the population. The difference between these groups represents the effect of such further selections as occur between entrance as freshmen in teacher-training institutions and acceptance as classroom teachers in the public schools. To aid in further interpretation of these results, and, to some extent, to provide an opportunity for checking them against other facts, the following chapter will present comparisons with other groups.

[1] The Combined Scale figure in the table which most nearly agrees with the 18.18 found for teachers in training is 18.15. This corresponds to a percentile rank of 89.62. A person at this point would be exceeded by 1,038 out of every 10,000 persons.

CHAPTER VI

COMPARISON OF TEACHERS WITH OTHER GROUPS AS TO INTELLIGENCE

THE PROFESSIONAL OCCUPATIONS

In order to make somewhat more concrete the meaning of the intelligence ratings for teachers given in Chapter V, these ratings will be compared with those of other groups for which Alpha and other test results are available. The criterion for the choice of these groups has been in the main the attempt to include most professional workers. This range turns out to be approximately the upper half of the population. The groups selected average but 2 per cent of their total distributions below the mean of the population, with the higher half of the groups having no members at all below the mean. A further criterion for the professional level may be taken to be intelligence equal to or above that of high school seniors, since professional activities, almost without exception, demand this degree of academic training as a minimum. Most of them, of course, demand more training—from two to eight years beyond high school graduation. This relationship between high school graduation and intelligence agrees with the findings of Cobb [14], Madsen and Sylvester [31], and Proctor [49], eight to ten years ago—that practically all high school seniors are in the upper half of the population group with respect to intelligence. This, of course, cannot be true at the present time. Since most Alpha data used in this study were gathered eight to ten years ago, comparisons are all made in terms of that period.

Taking, then, high school seniors as a minimum descriptive deadline, there were gathered a number of distributions for groups that are likely to be meaningful in social terms. They are mainly of two classes:

1. Army group. The Army furnished various groups that can be related on a commonsense basis roughly to civil life groups.

TABLE VI

COMBINED SCALE DISTRIBUTIONS OF VARIOUS ARMY GROUPS

COMBINED SCALE	HIGHER OFFICERS	OFFICERS, TWO YEARS OF COLLEGE	ALL WHITE OFFICERS	CAPTAINS	OFFICERS, HIGH SCHOOL GRADUATES	OFFICERS AND MEN, TWO YEARS OF COLLEGE	OFFICERS AND MEN, HIGH SCHOOL GRADUATES	WHITE DRAFT, TWO YEARS OF COLLEGE	WHITE DRAFT, HIGH SCHOOL GRADUATES
25.0–25.9	..	..	1	..	..	..	..	..	..
24.0–24.9	..	..	6	..	..	..	..	..	..
23.0–23.9	3	6	106	22	4	6	4	..	..
22.0–22.9	11	40	612	128	31	47	48	7	17
21.0–21.9	21	124	1,648	319	107	153	169	29	62
20.0–20.9	25	213	2,522	462	201	275	349	62	148
19.0–19.9	30	254	2,836	510	252	353	518	99	266
18.0–18.9	29	244	2,698	501	247	373	620	129	373
17.0–17.9	19	184	2,155	431	199	319	632	135	433
16.0–16.9	11	111	1,454	309	124	227	532	116	406
15.0–15.9	6	58	837	186	66	163	388	105	322
14.0–14.9	4	25	412	95	30	99	240	74	210
13.0–13.9	..	8	179	41	10	49	116	41	106
12.0–12.9	..	4	60	14	4	21	55	17	51
11.0–11.9	..	..	14	4	..	4	19	4	19
10.0–10.9	..	..	3	1	..	1	7	1	7
9.0– 9.9	..	..	1	..	..	..	1	..	1
8.0– 8.9	..	..	..	..	..	..	..	..	..
7.0– 7.9	..	..	..	..	..	..	..	..	..
6.0– 6.9	..	..	..	..	..	..	..	..	..
5.0– 5.9	..	..	..	..	..	..	..	..	..
4.0– 4.9	..	..	..	..	..	..	..	..	..
3.0– 3.9	..	..	..	..	..	..	..	..	..
2.0– 2.9	..	..	..	..	..	..	..	..	..
1.0– 1.9	..	..	..	..	..	..	..	..	..
0.0– 0.9	..	..	..	..	..	..	..	..	..
Number	159	1,271	15,544	3,023	1,275	2,090	3,698	819	2,423
Median	19.35	19.01	18.98	18.86	18.83	18.43	17.78	17.46	17.20
Mean	19.30 ± .46	18.89 ± .16	18.84 ± .05	18.73 ± .12	18.72 ± .16	18.27 ± .15	17.70 ± .11	17.30 ± .24	16.99 ± .12
S. D.	2.02	1.94	2.10	2.18	1.98	2.30	2.23	2.30	1.94

Table VI shows certain of the Army classifications.[1] If one thinks of officers above the rank of major, one is likely to adjudge them a superior executive group. In the main these officers would occupy superior executive positions in civil life. It may be noted that there is a gradual drop in the means until we pass the combined officers and men with only two years of college training. The last three groups show distinct drops. The difference between two years of college and high school graduation is probably the expected effect of the severe selection of entrance and persistence for two years in college. The small group of draftees reporting two years of college are, in all likelihood, a distinctly downward selection. Most of such men would have been commissioned or in officers' training schools. It is also likely that the last column is too low. The tendency would be for the recruit to claim slightly more than he justly could in academic status. The writer's experience in mustering draft men was that in the absence of other checks on the report of men regarding their academic status, such records are measurably unreliable.

Table VII gives Combined Scale distributions for the classes of students in Ohio University, for the college groups furnished by Yerkes in the *Memoirs*, and for high school seniors from Cobb [14]. The choice of the Ohio group will rest primarily on the good fortune of the testing of an entire university group, and adequate reports made upon this testing by Noble and Arps [43]. As to justification for being taken as a representative group, Ohio University is, in the first place, a state institution of large size. It therefore probably occupies a middle ground between the small, poorly equipped college and the highly selective large eastern private universities. It is located in a state which is central with respect to population, wealth, and other social-economic factors, such as geographical location; industrial balance; size, density, and rural-urban balance of population. It is the eleventh state in forty-five on Alpha ratings as given by Freeman [22: 455] and is in the central group, which was found by Cobb [14] to equal the Atlantic states in occupying a middle position in

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[1] Distributions for these groups are all found in the *Memoirs*. Distributions for higher officers and captains are on page 747; for two-year college groups and high school graduates, on pages 850–851. Distributions for white officers are taken from Table V.

TABLE VII

Combined Scale Distributions of Scholastic Groups

Scale	OHIO UNIVERSITY*						COLLEGE GROUPS (YERKES)†			SECONDARY‡
	Graduate Students	Seniors	Juniors	Sophomores	Freshmen	University Total*	Twenty Colleges, Men	All College Men and Women	Thirteen Colleges, Women	High School Seniors
25–25.9	..	..	..	..	..	..	..	..	..	..
24–24.9	..	..	..	..	..	2	..	1	..	..
23–23.9	4	6	6	4	6	23	14	13	1	..
22–22.9	14	31	38	33	34	151	66	81	16	9
21–21.9	26	86	113	112	140	484	206	280	74	45
20–20.9	27	138	185	206	312	874	402	576	174	129
19–19.9	25	151	221	269	467	1,147	552	817	264	233
18–18.9	18	136	219	273	506	1,166	514	885	311	309
17–17.9	11	107	164	211	454	957	484	777	291	311
16–16.9	6	64	92	127	328	625	357	590	232	210
15–15.9	3	28	40	66	179	321	240	378	140	98
14–14.9	3	10	14	28	81	134	146	199	53	35
13–13.9	2	3	4	11	29	49	84	97	14	7
12–12.9	..	..	1	5	8	14	35	41	4	1
11–11.9	..	..	..	1	1	3	13	13	1	..
10–10.9	..	..	..	..	..	..	2	2	..	..
9– 9.9	..	..	..	..	..	..	..	..	..	..
8– 8.9	..	..	..	..	..	..	..	..	..	..
7– 7.9	..	..	..	..	..	..	..	..	..	..
6– 6.9	..	..	..	..	..	..	..	..	..	..
5– 5.9	..	..	..	..	..	..	..	..	..	..
4– 4.9	..	..	..	..	..	..	..	..	..	..
3– 3.9	..	..	..	..	..	..	..	..	..	..
2– 2.9	..	..	..	..	..	..	..	..	..	..
1– 1.9	..	..	..	..	..	..	..	..	..	..
0– 0.9	..	..	..	..	..	..	..	..	..	..
Number	139	760	1,087	1,346	2,545	5,950	3,175	4,750	1,575	1,387
Median	20.06	19.21	19.07	18.82	18.38	18.75	18.32	18.31	18.17	18.10
Mean	19.79 ± .54	19.11 ± .20	18.92 ± .14	18.72 ± .16	18.31 ± .11	18.67 ± .08	18.19 ± .12	18.18 ± .08	18.13 ± .14	18.11 ± .14
S. D.	2.11	1.88	1.57	1.91	1.91	1.93	2.22	1.93	1.88	1.67

* *Op. cit.*, Table III.

† *Op. cit.*, Table II.

‡Used by permission of Warwick and York, Inc., Baltimore, Md.

the country in Alpha intelligence. The range of schools within the university is wide. Such error as lies in taking this university group as representative of the professional level in the population is probably in the direction of being too high. This is the conservative direction of error, since no advantage would be gained in rating teachers too high. A rough, common-sense comparison of these groups with professional, business, and educational groups might be made as follows:

SCHOLASTIC	ARMY	PROFESSIONS	BUSINESS	EDUCATION
Graduate Students	Best High Officers	Outstanding Leaders	Most Important Executives	University Professors and Important Administrators
Seniors	Higher Officers	Successful Members	Successful Managers	Average Professor or Superintendent
Juniors	Captain or Major	Average	Average Success	High School Teacher
Sophomores	Average Officer	Less Well Trained Groups	Minor Executive	Grade Teacher
Freshmen	Good Sergeants	Unsuccessful Members	Minor Position	Inferior Teacher

ALPHA INTELLIGENCE GROUPS IN THE PROFESSIONS

Table VIII gives the statistical information concerning all these groups and their relative ranks, combined in the order of the value of the mean. The S.D.[2] mean is given as an aid in checking Table IX, which furnishes a complete report on the interrelationships of all these groups, as determined by the significant difference technique. In this table non-significant differences are indicated by the numerical value of *Difference of means divided by the S.D. of the difference* in all cases where this result is less than three. Values greater than three are taken to be evidence of real difference. All other values (which exceeded three) are omitted. The halves of this table (which are duplicated at right angles from any point on the diagonal central line of zeros) are both given in order to show the relationships of the groups more clearly, although but one half is necessary in order to convey the facts. The striking sharpness of division into two main groups is somewhat surprising. The upper group may be thought of as two or three groups, overlapping at the corners. Graduate students, for instance, are significantly close only to high army officers. High officers, however, are not significantly different until four steps are taken down through university seniors, juniors, officers with two years of college, and all white officers. It is likely, of course, that larger groups in some cases would have shown more differences. For instance, the larger group of all

TABLE VIII

RANKS OF GROUPS ON COMBINED SCALE

(With statistical data)

	GROUP	NUMBER OF CASES	MEAN	PERCENTILE RANK IN POPULATION	STANDARD DEVIATION	$\frac{S.D.^2}{M}$
1	Ohio University, Graduate Students	139	19.79±.53	95.64	2.11	.032029
2	Army Officers Above Rank of Major	159	19.30±.46	94.29	2.02	.025662
3	Ohio University Seniors	760	19.11±.20	93.57	1.88	.004650
4	Ohio University Juniors	1,097	18.92±.14	92.92	1.57	.002246
5	Army Officers, Two Years of College	1,271	18.89±.16	92.79	1.94	.002962
6	All White Army Officers	15,544	18.84±.05	92.65	2.10	.000283
7	Army Captains	3,023	18.73±.12	92.22	2.18	.001572
8	Army Officers, High School Graduates	1,275	18.72±.16	92.07	1.92	.002891
9	Ohio University Sophomores	1,346	18.72±.16	92.07	1.91	.002710
10	Ohio University, All Students	5,950	18.67±.08	91.92	1.93	.000626
11	TEACHERS IN SERVICE (Ohio)	399	18.63±.28	91.77	1.87	.008765
12	Ohio University Freshmen	2,545	18.31±.11	90.49	1.91	.001433
13	Army Officers and Men, Two Years of College	2,090	18.27±.15	90.15	2.30	.002524
14	Twenty Colleges, Men (Yerkes Report)	3,175	18.19±.12	89.80	2.22	.001552
15	College Men and Women Combined (Yerkes)	4,750	18.18±.08	89.62	1.93	.000783
16	TEACHERS IN TRAINING (95 Per Cent Freshmen)	4,204	18.18±.09	89.62	1.88	.000840
17	Thirteen Colleges, Women (Yerkes)	1,575	18.13±.14	89.44	1.88	.002245
18	High School Seniors (Superior)	1,387	18.11±.14	89.36	1.67	.002010
19	Army Officers and Men, High School Graduates	3,698	17.70±.11	87.08	2.33	.001344
20	Army Draft, Two Years of College	819	17.30±.24	84.61	2.25	.006181
21	Army Draft, High School Graduates	2,423	16.99±.12	82.64	1.94	.001553

TABLE IX

Non-Significant Differences Between Various Groups

(All differences not shown are significant)

Group	1 Ohio University Graduate Students	2 Army Officers Above Major	3 Ohio University Seniors	4 Ohio University Juniors	5 Army Officers, Two Years of College	6 All White Officers	7 Army Captains	8 Army Officers, High School Graduates	9 Ohio University Sophomores	10 Ohio University, All Students	11 TEACHERS IN SERVICE (Ohio)	12 Ohio University Freshmen	13 Army Officers and Men, Two Years of College	14 Twenty Colleges, Men (Yerkes)	15 College Men and Women Combined	16 TEACHERS IN TRAINING (Freshmen)	17 Thirteen Colleges, Women	18 High School Seniors (Superior)	19 Army Officers and Men, High School Graduates	20 Army Draft, Two Years of College	21 Army Draft, High School Graduates
1 University Graduate Students	0.0	2.0																			
2 High Army Officers	2.0	0.0	1.1	2.3	2.4	2.8															
3 University Seniors		1.1	0.0	2.3	2.5																
4 University Juniors		2.3	2.3	0.0	0.4	1.6		2.8	2.9		2.8										
5 Officers, Two Years of College		2.4	2.5	0.4	0.0	0.9	2.4	2.2	2.3		2.4										
6 All White Officers		2.8		1.6	0.9	0.0	2.6	2.1	2.2		2.2										
7 Captains					2.4	2.6	0.0	0.2	0.2	1.3	1.0										
8 Officers, High School Graduates				2.8	2.2	2.1	0.2	0.0	0.0	0.8	0.8										
9 University Sophomores				2.9	2.3	2.2	0.2	0.0	0.0	0.9	0.8										
10 All University Students							1.3	0.8	0.9	0.0	0.4										
11 TEACHERS IN SERVICE				2.8	2.4	2.2	1.0	0.8	0.8	0.4	0.0										
12 University Freshmen												0.0	0.6	2.2	2.8	2.7	2.9				
13 Officers and Men, Two Years of College												0.6	0.0	1.2	1.6	1.6	2.0	2.4			
14 Men, Twenty Colleges												2.2	1.2	0.0	0.2	0.2	1.0	1.3			
15 College Men and Women												2.7	1.6	0.2	0.0	0.0	0.9	1.3			
16 TEACHERS IN TRAINING												2.8	1.6	0.2	0.0	0.0	0.9	1.3			
17 Women, Thirteen Colleges												2.9	2.0	1.0	0.9	0.9	0.0	0.3			
18 High School Seniors													2.4	1.3	1.3	1.3	0.3	0.0			
19 Officers and Men, High School Graduates																			0.0		
20 Draft, Two Years of College																				0.0	
21 Draft, High School Graduates																					0.0

university students furnishes a greater reliability—a fact that is indicated by the significance of differences with juniors, college officers, and all officers. This makes a break in the rectangularity of the group block. This group is shown graphically in Figure 3, which gives the means, their reliabilities, and the two-sigma

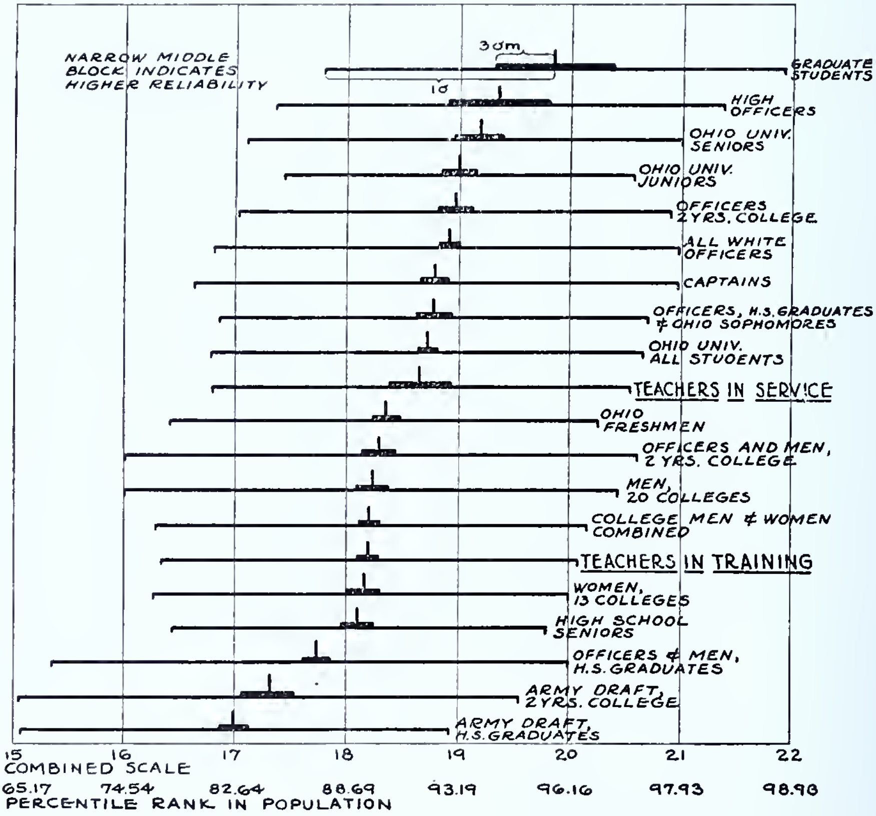

FIGURE 3. Means, Two-Sigma Ranges, and Reliabilities of Combined Scale Scores for Various Groups at Professional Levels of Intelligence

range. It will be noted here, in agreement with Table IX, that the two upper groups and the three lower groups tend to vary more widely from the two main large blocks, which are indicated by the almost vertical position of the means. Again, in Figure 4 these groups appear graphically. The small curve is drawn approximately to scale for the estimated total number of professional workers in the population. The vertical lines represent the means of these various groups. As a coincidence, the range of these means represents about an estimated sigma distance on either side of the mean for this entire group. Clustering of the means in two main groups and scattering of the higher and lower ones is fairly evident.

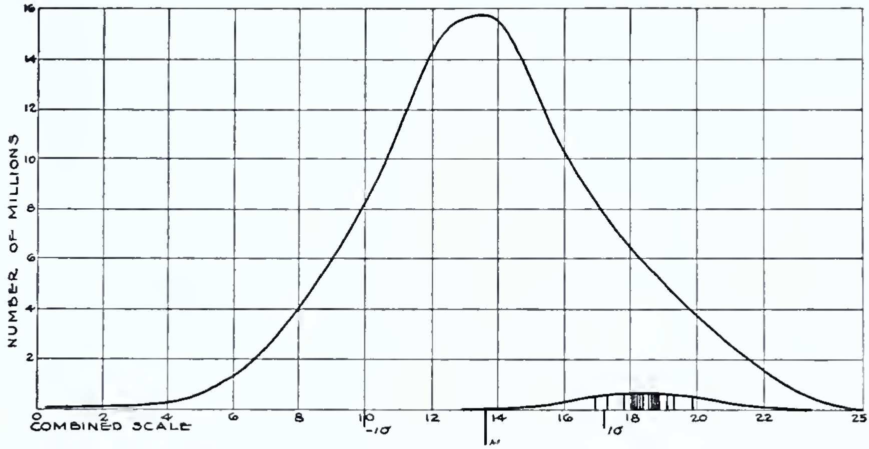

FIGURE 4. Distribution of Intelligence of General Population and of the Professional Group (Means of Various Army and Scholastic Groups Indicated by Location of Short Vertical Lines Under the Small Curve)

Table X is formed out of the information that appears in Table IX. Here teachers in service and teachers in training are compared separately with each of the three types of groups. It will be noted that the teachers in training group naturally with college people reported by Yerkes, while teachers in service exceed this group significantly. In a comparison with Army classifications teachers in service fall with officers, although they are at the bottom of the officer group. A larger group of teachers in service, with the resulting higher reliability, would possibly have shown a significant difference in comparison with officers of two years of college and with all white officers. Teachers in training form a group with all the two-year college Army group.

Compared with the university group, teachers in service are not significantly different from juniors, sophomores, or the whole group. A larger number of teachers in service would probably have shown a difference when compared with juniors. Teachers in training form a natural group with freshmen and high school

TABLE X

Teacher Groups Compared with Other Groups

Group	Number of Cases	Combined Scale Mean	Percentile Rank
College Groups Reported by Yerkes			
Teachers in Service	399	18.63	91.77
Men, Twenty Colleges	3,175	18.19	89.80
College Men and Women	4,750	18.18	89.62
Teachers in Training	4,204	18.18	89.62
Women, Thirteen Colleges	1,575	18.13	89.44
Army Groups			
Officers Above Major	159	19.30	94.29
Officers, Two Years of College	1,271	18.89	92.79
All White Officers	15,544	18.84	92.65
Captains	3,023	18.73	92.22
Officers, High School Graduates	1,275	18.72	92.07
Teachers in Service	399	18.63	91.77
Officers and Men, Two Years of College	2,090	18.27	90.15
Teachers in Training	4,204	18.18	89.62
Officers and Men, High School Graduates	3,698	17.70	87.08
White Draft, Two Years of College	819	17.30	84.61
White Draft, High School Graduates	2,423	16.99	82.64
Ohio University, and Superior High School Seniors			
Graduate Students	139	19.79	95.64
Seniors	760	19.11	93.57
Juniors	1,097	18.92	92.92
Sophomores	1,346	18.72	92.07
All Students	5,950	18.67	91.92
Teachers in Service	399	18.63	91.77
Freshmen	2,545	18.31	90.49
Teachers in Training	4,204	18.18	89.62
High School Seniors	1,387	18.11	89.36

Note: Grouping determined by presence or absence of significant differences is indicated by horizontal lines within the columns.

seniors. It must be recalled at this point that these high school seniors are, in all likelihood, a superior selection. They come from towns in Michigan, cities of Wisconsin, Illinois, and Iowa; approximately half come from the city of Detroit. This is a superior section of the country, as is shown above, and most of these students are in urban high schools. This median for high school seniors exceeds that for the Army high school graduates by a large amount, and it is closer to the median for high grade university freshmen than has been the case in other comparisons. It was probably a high figure eight years ago and is much too high for present conditions. With about half the children of the country of high school age in secondary schools, it is possible that the mean for Army high school graduates, when officers and men are combined, is more nearly representative of the present facts than the mean for the groups used by Miss Cobb [14].

In the main Table X would indicate that teachers in service are of about the intelligence of the average students who remain in the university through the sophomore year; that they are about on a par with Army officers up to, and including, captains; that they are above students generally in the colleges attracting lower intelligence and below the students of the best universities. The table seems to indicate further that teachers in training are of about equal intelligence with the students of the smaller and less well equipped colleges, and with all men and officers of the army who have had two years, and only two years, of college training; and that they are about equal to good university freshmen.

Table XI [47: 270] presents no facts that would change very much the judgments just expressed. Most of the colleges in this table are the smaller colleges. About half of them are those used by Yerkes. Teachers in service and teachers in training are just above and just below, respectively, the middle of this group.

Table XII compares the teachers with students in professional schools in universities and shows a similar result. University students of education include upperclassmen as well as freshmen, a fact that accounts for a difference between these two groups.

Bliss [7: 25] gives an additional bit of information that fits in with these conclusions. He cites from a report of the Bureau of Research and Guidance of the Oakland (California) public school

TABLE XI*

MEDIANS FOR VARIOUS COLLEGE GROUPS—ALPHA AND COMBINED SCALE EQUIVALENTS

COLLEGE	NUMBER OF CASES	ALPHA	COMBINED SCALE
Massachusetts Agricultural (men)	154	150	19.55
Brown University (men)	210	142	19.06
Syracuse University (both sexes)	786	142	19.06
Colorado College (men)	148	142	19.06
Colorado College (women)	178	142	19.06
Rutgers College (men)	358	138	18.82
Johns Hopkins Freshmen (men)	140	137	18.76
Notre Dame (men)	321	137	18.76
Ohio State University (both sexes)	5,950	136	18.70
TEACHERS IN SERVICE (women)	399	136	18.63
Penn State College (both sexes)	847	132	18.45
University of Minnesota Freshmen (men)	534	129	18.27
University of North Dakota (women)	117	129	18.27
University of Minnesota Freshmen (women)	354	128	18.21
TEACHERS IN TRAINING (women)	4,204	128	18.18
Southern Methodist (men)	162	127	18.15
University of Idaho (men)	277	125	18.03
Southern Methodist (women)	159	123	17.90
Colorado Teachers College (women)	266	122	17.84
University of Florida (men)	215	120	17.72
University of Idaho (women)	169	117	17.54
Lincoln Memorial (men)	171	86	15.65
Atlanta Southern Dental (men)	184	80	15.28

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system without identifying the particular report. He gives in this instance the distributions according to army letter ratings of applicants for principalships, applicants for teaching positions, and cadet teachers in the University of California Teachers College, and compares these with similar distributions of higher officers, majors, and captains in the Army. Table XIII gives this comparison. It may be seen here that teacher applicants resemble higher officers most closely in the number having very superior and high average intelligence. In the number having superior intelligence they resemble captains most closely. Cadet teachers apparently exceed even the higher officers in intelligence as measured by the Army Alpha test. This result would indicate a very superior group of teachers in training.

TABLE XII *

MEDIANS FOR OHIO STATE UNIVERSITY SCHOOLS—ALPHA AND COMBINED SCALE EQUIVALENTS

COLLEGE	NUMBER OF CASES	ALPHA	COMBINED SCALE
Graduate Students	152	157	19.98
Commerce	52	147	19.37
Medicine	141	142	19.06
Law	141	142	19.06
Engineering	1,392	141	19.00
TEACHERS IN SERVICE	399	136	18.63
Agriculture	859	133	18.51
Arts	1,966	133	18.51
Education	382	133	18.51
TEACHERS IN TRAINING (freshmen)	4,204	128	18.18
Pharmacy	109	125	18.03
Dentistry	152	115	17.42
Veterinary Medicine	93	112	17.23

* Used by permission of Henry Holt and Company.

TABLE XIII *

COMPARISON OF TEACHING APPLICANTS AND ARMY OFFICERS AS TO ALPHA RATINGS (PER CENTS)

LETTER RATING	ABOVE MAJOR	MAJOR	CAPTAIN	PRINCIPAL CANDIDATES	TEACHING APPLICANTS	UNIVERSITY OF CALIFORNIA CADET TEACHERS
A	63.6	64.4	53.4	74	61.7	65.0
B	25.1	25.0	29.0	16	30.5	28.8
C+	8.9	9.2	14.4	10	6.7	5.6
C	2.5	1.5	3.8	0	.8	.5
C−	.0	.2	.4	0	.3	.0
D	.0	.1	.0	0	.0	.0
E	.0	.0	.0	0	.0	.0
Number of Cases	100.0 159	100.0 517	100.0 3,023	100.0 19	100.0 357	100.0 177

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TABLE XIV *

Medians: Results of the Use of the Otis Tests with Various Groups

(Equivalents of two Otis tests and Army Alpha are based upon curves drawn from the latest reports given by Otis)

Group	Number of Cases	Otis Advanced	Otis Higher	Alpha Equivalent	Combined Scale
Colleges					
A	34		65	164	20.40
B	43		64	160	20.16
C	14		62	152	19.67
D	21		59	140	18.94
E	26		57	133	18.51
F	220		56	130	18.33
G	72		56	130	18.33
H	98		55	127	18.15
I	523		55	127	18.15
J	110		54	123	17.90
K	36		53	120	17.72
L	35		53	120	17.72
M	194		52	116	17.47
N	142		51	113	17.29
O	178		46	98	16.38
P	50		39	76	15.04
Q	24		37	70	14.67
Freshmen, Eight Colleges (Otis)	524	170		147	18.37
Weighted Average, Groups Exceeding 100 Cases	1,891				18.19
Teachers Colleges					
R	201		61	148	19.43
S	29		55	127	18.15
T	16		53	120	17.72
U	170		51	113	17.29
V	226		45	94	16.13
Weighted Average, Groups Exceeding 100 Cases	597				17.57

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* Included in Table XIV are the following colleges named here in alphabetical order:

Adelphi College
Albion College (Mich.)
Bates College (Me.) Freshmen
California Institute of Technology
Central College (Ark.)
Concordia Teachers College (Ill.)
Crane Junior College (Chicago)
Indiana University (Commerce and Finance)
Iowa State College (Freshmen)
Iowa State College (Summer Session)
Lehigh University (Pa.) Freshmen
Manchester College
New York State Teachers College (Albany)
Peabody College (Tenn.)
Pomona College
Ripon College (Wis.) Freshmen
Savage School (Physical Training) Freshmen
University of Colorado
Upper Iowa University (Summer Session)
Washington and Lee University
Western College (Oxford)
Wittenberg College (Ohio)

Used by permission of Dr. A. S. Otis.

TABLE XIV (*Continued*)

MEDIANS: RESULTS OF THE USE OF THE OTIS TESTS WITH VARIOUS GROUPS

GROUP	NUMBER OF CASES	OTIS ADVANCED	OTIS HIGHER	ALPHA EQUIVALENT	COMBINED SCALE
Normal Schools					
(2) Worcester (Mass.) Superior 2-yr.	70 *	173		152	19.67
(1) Bridgewater, 3rd Year	190 †	172.1		150	19.55
(2) Worcester, 4-yr. Junior H. S.	44 ‡	171		147	19.37
(2) Worcester, 4-yr. (2/3 Freshmen)	123	169.2		142	19.06
(1) Bridgewater, 2nd Year	†	164.8		140	18.94
(1) Bridgewater, Freshmen	†	162.3		136	18.70
(3) Worcester, 2-yr. Freshmen	59	159		132	18.45
(4) Ohio Co. Normals (1-yr. Course)	225	158.1		130	18.33
(2) Worcester, 2-yr. Kindergarten-Primary	44 ‡	156		127	18.15
(5) Worcester, Freshmen	291	155		125	18.03
(4) Worcester, 2-yr. (Inferior)	70 *	134		97	16.32
Ohio Co. Normals (1-yr. Course)	1,571		43.4	91	15.95
8 Normal Schools (Otis Norms)	1,017	162		136	18.70
High School Seniors					
H. S. Seniors (Early Otis Norm).	1,101	153		122	17.84
(4) H. S. Seniors (Ohio Villages)	418	152.5		121	17.78
H. S. Seniors (Late Otis Norms)	15,715		44	92	16.01

Figures marked are totals for like-marked groups; not reported separately, e.g., 70 * is the total which includes both superior and inferior second year students at Worcester. The size of the superior group is not recorded separately. Reporters: (1) Colvin [15], (2) Averill and Mueller [2, 3], (3) Averill [2], (4) Bliss [7], (5) Holmes [25].

RESULTS OF OTHER TESTS

The Otis tests have had a widespread use [44]. Dr. Otis has furnished a table of equivalents for his Advanced test and his Higher test. He has also indicated score ranges on his Higher test equivalent to the letter ratings used by the Army psychologists in interpreting Alpha. From this information a curve has been drawn by means of which the Otis scores have been converted into approximate Alpha and Combined Scale equivalents. In view of the fact that the equivalents furnished by Dr. Otis are based upon comparisons of his norms with those of the previous Alpha testing, it is probably reasonable to treat his data, when converted, as additional but less accurate Alpha data. Table XIV gives medians for a number of college groups, teachers college students, various classes of normal school students, and high school seniors. Apparently, from these data, normal school groups show a range about equal to that of college groups. It must be remembered, however, that most of these colleges are small and that a very great majority of the groups are entirely too small to have much meaning. Otis gives an earlier norm for college students that approximates 19.37 on the Combined Scale. His later norm, based on the students from this list of smaller colleges, is 53, which approximates 17.72 on the Combined Scale. Because this figure seems entirely too low to represent colleges in general, a weighted average median was computed for the groups cited that exceed one hundred cases. This gives 18.19 on the Combined Scale, which is about on a par with Yerkes's college groups, and is probably still too low for colleges in general. His teachers colleges, having groups in excess of one hundred, give a median of 17.57, which certainly is not representative of teachers colleges, that include in considerable number those turning in Alpha scores from 120 to 135, or 17.72 to 18.63, respectively, on the Combined Scale. This judgment would seem to be borne out by Otis's own earlier norm for 1,017 normal school freshmen of 162 on his Advanced test, which is roughly equivalent to 18.70, Combined Scale. His high school figures show a like discrepancy. The early Otis norm of 153 (Advanced Scale) would give a Combined Scale equivalent of 17.84. This agrees with the norm for 418 high school seniors in Ohio villages, but disagrees considerably with his later norm for the Higher test, which gives an equivalent of 16.01, Combined Scale. Twelve thousand of these students were in the state of Illinois. There are two factors that may coöperate to cause these discrepancies. One is the increased range of intelligence, due to the greatly increased high school enrollments in recent years; the other is a possible unreliability in the equivalent scores given by Otis for his two tests. It is probable that he needs to work out a new comparison of the two tests based on the later and fuller results from his Higher Examination.

In every case equivalent scores obtained from the Higher Examination seem to be too low when compared with those on the Advanced Examination.[2] In the main this table would seem to indicate that normal school students and teachers college students vary somewhat as college students do according to the length of training and character of the institution attended.

Table XV gives distributions and the norms based upon them found by Thurstone [58] for freshmen students of engineering, for liberal arts college freshmen, and for normal school freshmen. In these results, engineering freshmen and liberal arts college freshmen are not significantly different, but normal school freshmen are significantly different from the other groups. These data, however, need criticism from the point of view of sampling. Thurstone's engineering freshmen and his liberal arts college freshmen are chosen from all sections of the country and from all types of colleges falling into these categories. He then presents as presumably representing normal schools through the country, a group of normal schools confined, with one exception, to the state of Pennsylvania. In view of the fact that a number of students have agreed upon distinct differences between eastern and western normal schools in general, it would certainly seem unsafe to accept results from one eastern state as representative of the country. There is, in addition, some positive evidence that this group of schools represents a considerable selection downward. Among Thurstone's normal schools, Millersville stands at the top, with a median of 95.5. This is twenty points above the median for the entire group of Pennsylvania normal schools. The next nearest school has a median of 88.0, and no others are as high as 80. In other words, Millersville stands in a class by itself, exceeding all other Pennsylvania normal schools by a very large difference. It happens that Millersville was one of the schools cited by Yerkes in the *Memoirs* [67]. When tested on Alpha at that time, the school yielded a median of 117. By referring to

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[2] In a pamphlet entitled, *Manual for Determining the Equivalence of Mental Ages Obtained from Group Intelligence Tests*, published by the World Book Company, Ross Runnels gives equivalents in Advanced Scale points which are on the average twelve points higher for each Higher Examination score than those given on the Otis Interpretation Chart. To the extent that Runnels is right the discrepancy discussed above would be explained. Results from Otis tests cited here would correspond much more closely with Alpha results already discussed. Runnels's report is dated 1930.

TABLE XV

Distributions of Thurstone Cycle-Omnibus Intelligence Tests for College Students *

Engineering Freshmen		Liberal Arts Freshmen		Normal School Freshmen	
163– 67	2	160–69	4	160–69	0
158– 62	15	150–59	31	150–59	1
153– 57	14	140–49	77	140–49	4
148– 52	31	130–39	123	130–39	8
143– 47	34	120–29	262	120–29	24
138– 42	69	110–19	395	110–19	57
133– 37	82	100–09	657	100–09	100
128– 32	137	90–99	787	90–99	142
123– 27	173	80–89	852	80–89	235
118– 22	233	70–79	846	70–79	307
113– 17	256	60–69	732	60–69	303
108– 12	368	50–59	422	50–59	238
103– 07	405	40–49	209	40–49	108
98–102	492	30–39	76	30–39	40
93– 97	561	20–29	18	20–29	7
88– 92	564	10–19	4	10–19	1
83– 87	575	0– 9	0	0– 9	0
78– 82	580				
73– 77	524				
68– 72	483				
63– 67	378				
58– 62	287				
53– 57	202				
48– 52	162				
43– 47	76				
38– 42	53				
33– 37	30				
28– 32	14				
23– 27	2				
18– 22	2				
	6,804		5,495		1,575
Median	88.8		86.6		74.8
Mean	89.39		86.3		74.46
S. D.	23.05		24.30		20.8

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* Used by permission of Public School Publishing Co., Bloomington, Ill.

Table IV, it will be seen that a median of 117 is distinctly low in this group, since the weighted median for the whole group is 127. If, then, a school that is exceptionally high in Pennsylvania is distinctly low as compared with normal schools through the country, one can hardly escape the conclusion that a median for Pennsylvania normal schools must be entirely too low to represent American normal schools in general. Figure 5 shows various groups, distributed according to three levels of intelligence, that were used by Kirkpatrick [27] in reporting on students of Massachusetts normal schools. He has reported for ten Massachusetts normal schools and for high schools. The Thurstone normal school distribution, according to this scheme, is included. It will be seen that Thurstone's normal schools are about comparable to Massachusetts high schools, and that Massachusetts normal schools are somewhat superior to Thurstone's group and not markedly different from Thurstone's college groups. Kirkpatrick concludes that although the colleges secure more people of high intelligence than the normal schools, they secure more people of lower intelligence, and he finally concludes that there is about 80 per cent of overlapping between normal schools and colleges in general. This conclusion is borne out by the curves given by Thurstone [58] in reporting his norms; the areas of his normal school and college curves overlap almost exactly 80 per cent.

	Per Cent Scoring		
	Less Than 57	*57–97*	*Above 97*
High School Seniors	+++++++++	+++++++++++++++++++++	+++
Normal School Freshmen *	++++++++	++++++++++++++++++++++	+++
Ten Massachusetts Normal Schools†	+++	++++++++++++++++++++++++	++++++
College Freshmen *	++++	++++++++++++++++++++	+++++++++
Engineering Freshmen*	+++	+++++++++++++++++++	+++++++++++

FIGURE 5. High School Seniors and Freshmen in Normal Schools, Liberal Arts Colleges, and Engineering Schools, Compared Upon the Basis of the Thurstone Test

* Thurstone † Kirkpatrick

The Terman and Thorndike tests do not yield enough of published data to be useful to this investigation. With Thorndike's test there is evidence from one eastern normal school that falls below high-standard colleges and above low-standard colleges [23]. This result is not different from conclusions previously drawn in this study. The Terman test has been used relatively little in institutions above the high school. One additional bit of evidence is available. Bliss [7: 24] gives results of the use of the Miller

Test of Mental Ability with high school seniors and applicants for teaching positions in Los Angeles. Whitney [65] gives medians for two groups of college of education juniors, which he was comparing. Table XVI combines these two reports and shows that the intelligence of teacher applicants lies at about two-thirds the interval from high school seniors to college of education juniors, if it be assumed that the scores represent increments of intelligence that are somewhat equal over the range from 65 to 100. This result would agree roughly with the results heretofore cited.

TABLE XVI

Comparison of High School Seniors, Applicants to Teach in Los Angeles, and Juniors in a College of Education—Scores on the Miller Test of Mental Ability

Score	High School Seniors *	Teaching Applicants *	College of Education Juniors †	
			Prepared in University Colleges	Prepared in Normal Schools
110–120	1	20		
100–109	2	111		
90– 99	13	186		
80– 89	13	119		
70– 79	17	92		
60– 69	28	66		
50– 59	21	44		
40– 49	7	25		
30– 39	8	16		
20– 29	4	6		
10– 19	1	8		
0– 9	0	1		
Number	115	694	223	67
Median	65.9	87.5	97.0	96.0
Q_3			88	87
Q_1			104	101

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* Bliss, W. B., *Intelligence of Teachers*. Ohio State Department of Education, Special Studies Series, No. 4, 1923.

† Whitney, F. L., "Intelligence Levels Among State Normal-School Graduates." *Journal of Educational Research*, 7:229–235, March, 1923, No. 3. Distributions not given.

CONCLUSIONS TO CHAPTERS V AND VI

1. Taking into account the disadvantage to women, which investigators have found in Army Alpha test to amount to approxi-

mately four points, there is no distinct difference between freshmen in teacher-training institutions in general and freshmen in colleges in general, except that all colleges taken together probably attract a wider range of intelligence than all normal schools taken together.

2. Students in teacher-training institutions who undertake an equal length of training and those who survive an equal length of training do not differ significantly from students in other institutions of higher learning.

3. The disagreement between investigators who have found normal school students inferior to college students and those who have found them on a par with college students is concluded to be settled in favor of the latter group. The common opinion that normal school students are generally inferior in native intelligence has been based more upon differences in training and upon unfair selections than upon the proper interpretation of test results.

4. Training, increased and improved until it made demands equal to those of college training, would select teachers of intelligence comparable in every way to that of other professional groups.

5. The relationship shown between the intelligence of the small group tested by Morton in Ohio and that of students of normal schools and colleges indicates that Morton found a group not far from the average American grade teacher in service.

6. Teachers in service in this country are found almost altogether in the upper half of the range of general intelligence. Their mean falls approximately at a percentile position of 91 in the general population—a position that indicates an intelligence about equal to that of the average officer in the Army, the average university sophomore, and the average competent professional worker.

7. The mean for teachers in service prior to 1925 who had two years or more of training beyond high school fell at 1.38 S.D. above the mean of the population. All[3] teachers exceeded 50 per cent of the population. Three-fourths of all teachers exceeded 85 per cent of the population; half of the teachers exceeded 90 per cent; and one-fourth of the teachers fell in the top 4 per cent of the population in intelligence as measured by the Army Alpha test.

[3] That is, all but 36 in 10,000.

CHAPTER VII

THE DISTRIBUTION OF ACTUAL INCOMES

METHOD OF ESTIMATING INCOME DISTRIBUTIONS

THROUGHOUT this study, 1925 has been the year of reference for several reasons. The data upon intelligence of teachers, considered in Chapters V and VI, were gathered from tests given for the most part in the period from 1920 to 1925, and should represent conditions that still prevailed at the end of that period. No year later than 1925 furnishes data so complete and accurate, and with the exception of considerable growth in the national income, general conditions have not changed so remarkably in the succeeding five years as measurably to alter the value of statistics used for purposes of illustration. Therefore when it seemed desirable to have an estimated distribution of individual incomes, the statistics for 1925 were used as a basis.

It is desirable to have as accurate distribution of incomes as possible for comparison with the ideal distribution discussed in Chapter IV. The degree of divergence of present conditions from those that would bring about the maximum total dividend is of interest. This degree of divergence will offer some light on the economic inefficiency of an unplanned and uncontrolled distribution of income, and it will help somewhat to measure the amount of change necessary in order to bring about the optimum division of wealth.

The construction of such an estimated distribution is by no means a simple task in the present state of available information. The attempt made for the purposes of the present study is described briefly in Appendix B (p. 103). It is necessary at this point only to outline the method and results. The total numbers of gainfully employed were divided into four groups: agricultural laborers, other wage earners, salaried employees, and enterprisers and owners. Sufficient data were available for these groups to apply Moore's tables to each group in turn. When the ordinates were added and the total distribution was combined with the reported distribution of income as shown in the tax returns, a composite was achieved that checks fairly well with certain generally accepted estimates of King [26:173] and Copeland [16: 836], and with the indications of the federal income tax reports when they are superimposed upon the aggregate of non-taxable incomes. It also provides median incomes for various groups that compare pretty well with similar figures from other sources. To the extent that the distribution is in error, it apparently represents conditions less unequal than the conditions that actually exist. For purposes of comparison with an ideal distribution, it would therefore seem to be a conservative estimate. It is of considerable interest to note that the use of Moore's theory and tables, originally applied within homogeneous groups of wage earners, serves, when the total group is divided into relatively homogeneous parts, to predict so accurately the actual facts that two points are suggested: first, the possibility of considerable usefulness of his tables or of an improvement upon them when they are applied to more elaborate divisions of wage earning groups; second, the fact that wages actually tend to distribute themselves in accordance with ability, but that this tendency is defeated in a variety of ways by barriers that have grown up in our economic and social institutions, but that may be said to be "unnatural."

The resulting distribution, which is taken to be a reasonably accurate statement of the facts in 1925, is given in percentage form in column 3 of Table XVII. It is a combination of columns 1 and 2, according to a method described in Appendix B. Column 4 is an estimated distribution for 1927 made by Dr. J. K. Norton, at that time Research Director of the National Education Association [39: 146]. The reasons for not adopting the Norton distribution are given in the Appendix.

Column 5 gives a normal distribution of the total national income for 1925, with the minimum annual wage for the lowest 1 per cent assumed to be $250. This normal distribution is the one which will be regarded as an ideal distribution, and one which would conform to Pigou's requirement for maximization of the total income. It will be recognized at once that the range of this

TABLE XVII

THEORETICAL, COMPOSITE, AND NORMAL DISTRIBUTIONS OF INCOME IN PER CENT OF NUMBER GAINFULLY EMPLOYED RECEIVING VARIOUS INCOMES IN 1925, AND NORTON'S DISTRIBUTION FOR 1927

INCOME IN DOLLARS	(1) THEORETICAL DISTRIBUTION	(2) INCOME TAX RETURNS, 1925	(3) COMPOSITE DISTRIBUTION	(4) NORTON'S DISTRIBUTION, 1927	(5) NORMAL DISTRIBUTION
0– 500	4.18		4.22	2.3	2.00
501– 1,000	19.39	2.35	19.54	13.7	7.00
1,001– 1,500	33.72		35.20	23.3	19.00
1,500– 2,000	20.47	25.70	21.37	25.8	30.00
2,001– 2,500	8.41		9.80	18.3	26.00
2,501– 3,000	3.14	20.20	3.66	8.2	12.00
3,001– 3,500	1.96		1.96	2.7	4.00
3,501– 4,000	1.03	17.92	1.04	1.7	
4,001– 4,500	1.09		.81		
4,501– 5,000	.68	13.91	.51	1.5	
5,001– 5,500	.68		.20		
5,501– 6,000	.68	4.18	.20	.7	
6,001– 6,500	.46		.13		
6,501– 7,000	.68	2.91	.13	.4	
7,001– 7,500	.46		.10		
7,501– 8,000	.46	2.15	.10	.3	
8,001–			.08		
9,000	.68	1.58	.07	.2	
9,001–			.06		
10,000	.68	1.26	.06	.15	
10,001–			.05		
11,000	.23	.95	.04	.12	
11,001–			.04		
12,000	.46	.77	.03	.10	
12,001–			.03		
13,000	.23	.64	.03	.07	
13,001–			.03		
14,000		.53	.02	.05	
14,001–			.02		
15,000	.23	.45	.02	.04	
Above 15,000	...	4.53	.43	.39	
	100.00	100.00	100.00	100.00	100.00
Median	$1,391	$3,098	$1,373	$1,709	$1,865
Mean	1,840	3,295	1,625	1,865	1,865
S.D.	1,670	3,450	1,280	1,105	650

distribution might be greater or smaller, according to the minimum adopted.[1] Pigou notes on page 142 that more than one maximum is possible, and compares these to hilltops of varying heights. There is no way of knowing what range of distribution would be most favorable and, therefore, what minimum income would be most justifiable from a purely economic point of view. It may be hoped that experience would indicate a considerably higher minimum than $250. Since this study is not primarily concerned with lowest income groups, it has been thought wiser not to become involved in a number of additional questions related to minimum wages. In view of the large number of minors at work and of low-paid agricultural workers, it is thought that $250 represents fairly well what the average of the lowest 1 per cent of gainfully employed is actually receiving.

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[1] The range could also be extended by using a table of differences based on an arbitrarily increased value for the standard deviation. This device would yield a distribution more like the

The normal distribution is calculated from Moore's table of Average Differential Ability [35: 98]. This calculation yields a distribution of the same shape as that taken by the results of measuring any natural trait in a large number of individuals. It therefore conforms to the probable shape of the curve of native ability, however such ability may be described and measured. As shown by Pigou's argument in Chapter III, the distribution of earned income would tend to take this form in the absence of barriers, such as ignorance, lack of training, hindrances to mobility, and costs of change. Income from inherited wealth has no such tendency. On the contrary, to the degree that ability tends to be inherited, wealth would tend somewhat to become increasingly concentrated in the hands of able families. For this reason, any approach to an ideal distribution of all income will necessitate a special degree of planning and control with reference to inherited wealth.

COMPARISON OF ACTUAL AND NORMAL DISTRIBUTIONS

The argument in previous chapters, advanced in proof that the normal distribution of income maximizes the national dividend, may be somewhat strengthened by numerical and graphic comparisons of the actual and the ideal distributions. Figure 6 shows the low end of the actual distribution, represented by a

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present conditions, at least in the range of incomes; but it would be more like the normal distribution in the form of its curve. It is possible that such arbitrary curves might be useful intermediate steps toward a truly normal form.

curve smoothed upon the percentage ordinates. If the right end of this curve were drawn to the same scale to include our highest incomes (five million dollars), it would have to be about 330 feet long. Figure 7 represents the normal distribution. The upper end of this curve appears to close a little above $3,500. It really extends above $6,000. Figure 8 represents the ideal curve, superimposed upon the actual. In order to calculate the effect on economic conditions of changing from one of these curves to the other, a vertical line has been drawn through the $1,500 point to represent the highest income of a gainfully employed person that must be spent entirely for necessities. An income

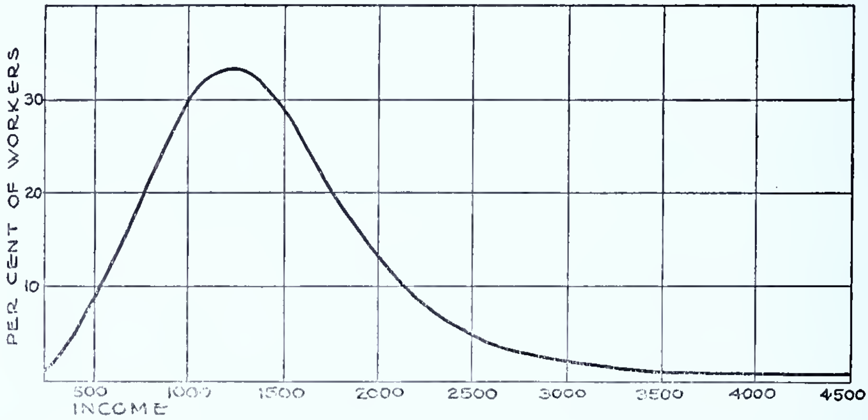

FIGURE 6. Actual Distribution of Total Incomes in 1925 as Estimated in the Composite Distribution

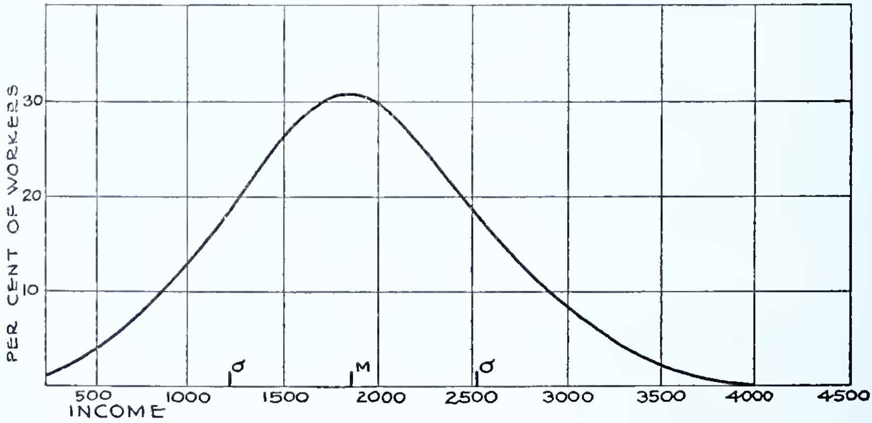

FIGURE 7. Normal Distribution of Total Incomes for 1925

below this point allows the individual with an average number of dependents no choice in its disposition.[2]

Incomes falling at the left of this line are not subject to choice in spending. They go automatically to purchase necessities. Incomes at the right of this line allow for choice, but, beyond a certain amount of increased consumption, they must be invested and therefore applied to production. Additional amounts added to incomes below this line, which bring them above the line, bring new consumption power into the market. The shaded area represents a gain in the fraction of the total income, subject to choice in expenditure, which would result from movement to an ideal distribution. Leaving out of consideration improvements in general productivity, the additions to lower incomes that would make up this lower area would be drawn from in-

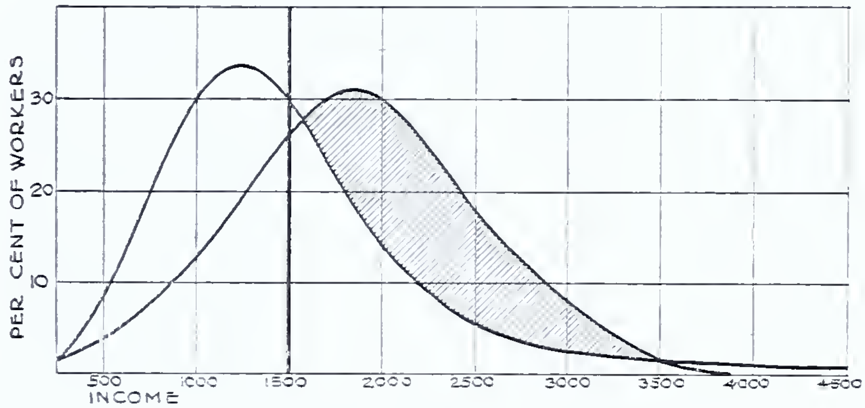

FIGURE 8. Comparison of Actual and Normal Distributions of 1925 Incomes

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[2] $1,500 was arrived at as follows: the Middletown minimum family income was reduced by the following corrections: (1) the amount of insurance was reduced to $3,812, which was the unweighted average of amounts found to be held by office employees, retail clerks, and skilled and unskilled workers in a study of 20,000 cases made by the Phoenix Mutual Life Insurance Company in 1927 and reported on page 486 of *Recent Economic Changes*; (2) the Middletown family included three children. An estimate of twenty-seven million families and forty-three and eight-tenths million gainfully employed yields an average of 1.6 gainfully employed persons per family. Dividing the Middletown figure by 1.6 gives $1,200 per gainfully employed worker. This is the sum per gainfully employed worker that must, under present conditions, be spent for absolute necessities. With a movement toward an ideal distribution and a resulting increase of lower wages, large numbers of the three million children now employed and a considerable fraction of the nine million women now employed would probably be withdrawn from industry. In this moving situation, it is difficult to determine any line that might be called a necessity wage. $1,500 has, therefore, been adopted arbitrarily as a probably conservative point from which to measure changes in effects.

comes now above $3,500. These funds would be drawn away from promotion of production and would be divided between increased consumption and reinvestment by a large number of people. Table XVIII shows the contrasting conditions in figures.

TABLE XVIII

POSSIBLE IMPROVEMENT OF INDIVIDUAL AND GENERAL ECONOMIC CONDITIONS THROUGH NORMAL DISTRIBUTION OF 1925 INCOME

	COMPOSITE DISTRIBUTION *	NORMAL DISTRIBUTION	DIFFERENCE
Per Cent Gainfully Employed Receiving Less Than $1,500 Each.	59	28	—31
Per Cent of Total Income Going to Workers in Amounts Less Than $1,500......................	32.3	15.9	—16.4
Number Gainfully Employed with Incomes Allowing Choice......	17,995,146	31,601,232	+13,606,086
Amount of Total Income Subject to Choice in Spending..........	$55,492,400,000	$68,873,546,500	+$13,057,453,500
Per Cent of Total Income Subject to Choice in Spending..........	67.7	84.1	+16.4

* The Composite Distribution is a theoretical distribution which seems, from various tests, to conform fairly well to the actual facts of the distribution of income in 1925.

Normal distribution would mean a reduction in the number of incomes of less than $1,500. This reduction would be from 59 per cent to 28 per cent of all the gainfully employed. Thus 31 per cent of all gainfully employed persons would be moved over the line to a situation in which some funds could be used to satisfy choices. Thirteen and one-half millions of workers would move out of the group of those who have incomes that must be spent entirely for necessities. The amount of total income subject to choice in spending would be increased from fifty-five and one-half billions to almost sixty-nine billions. In the re-application of the difference of thirteen billions per year, it is almost certain that enough would be applied to increased consumption to more than wipe out the eight billions of surplus savings mentioned by Professor Dewey in his *Individualism*. This, in terms of a money measure, is one meaning of a change to a more defensible distribution of income. Entirely in addition to the improvement of the economic machinery would be the immeasurable social good resulting from increasing the number of workers, with their dependents, on the right of this line from eighteen to thirty-one and one-half millions.

DETERMINATION OF GROUP INCOMES

The discussion in this chapter thus far has been an attempt to make more concrete the meaning of the statement that raising the national income to its highest point demands distribution of that income among individuals in accordance with the distribution of inherent ability, a distribution that may be expected to assume the form of the "normal" curve. Such a distribution of income, in turn, demands that any sub-group receive an income corresponding to the scarcity of the degree of ability possessed by that group. Scarcity is measured by variability from the mean of the group, which, in turn, is measured statistically in terms of the standard deviation from the mean. The average income that would be fair for any group then becomes the income that varies in the same direction and amount from the mean of all incomes, as the ability of the group in question varies from the mean ability of the whole group.

In statistical terms, the description of the normal distribution of income for 1925 (if $250 is taken as the minimum income) is as follows. The range is from $250 to $3,700.[3] The median and the mean coincide at $1,865 and the standard deviation is $650. A group whose mean intelligence was measured by 16.62 on the Combined Scale would be on the average 1 S.D. above the mean of the population in intelligence. Such a group would be entitled to a salary 1 S.D. above the mean income, which is equal to $1,865 plus $650. This average income would be $2,515.

Since the basic distribution includes all income, the sample income just cited must include some income from capital holdings as well as from wages or salary. An extension of the general argument of this study would indicate a normal distribution of income from capital holdings, and, consequently, ownership of capital goods.[4] In distributing this fraction of the total normally, a minimum of $100 was arbitrarily taken for the reason that $100 a year invested at 4 per cent will provide at the age of sixty-two, if the worker has worked forty-five years, an annuity of about $1,000. This would seem to be a fair minimum to be set aside to the credit of the poorest-paid workers and represents an actual ownership of capital goods. A normal distribution of property income with $100 as a minimum ranges from $100 to $1,212; the mean is $657 and the standard deviation is $223.

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[3] Average for the highest one-tenth of one per cent.

The sample group referred to above would then include in its total average income of $2,515 an income from property holdings that is 1 S.D. above the mean property income. This would equal $657 plus $223, or $880. The actual wage, aside from property income, would then be $2,515 less $880, or $1,635. This property income of $880 might be made up of such items as interest, dividends, rent, accumulated insurance or annuity payments, or the rental value of the equity in a partly or entirely owned home, occupied by the worker. If the average worker in this group was not in receipt of property income in some form to the amount of $880, only such amount as was actually accruing to him in property income should be deducted from the $2,515 to determine the fair wage of the group. Any provision of state or industrial insurance for old age should be charged against the fair amount due the workers in the group as property income and a deduction should be made accordingly, unless such insurance is paid for directly by the worker from his own funds.

Table XIX gives for the five types of workers described by Taussig [52: 134] a comparison of actual incomes and fair incomes. The professional and executive group here are considered in the main as to earned incomes. Besides showing the situation of teachers, Table XIX brings out clearly certain facts as to the relative fortunes of the various groups. It is worth while to emphasize in particular two rows of figures. The first is the percentage each group lacks of receiving a fair income. Teachers share with and exceed common and semi-skilled labor in an excessively poor position in relation to other kinds of workers. The second is the final row of figures, labeled Difference between Actual Wage and a Least Fair Wage. "Least fair wage" means here the wage that would contribute most to general economic welfare if conditions were static and every worker were getting his fair share of normally distributed property income. The interest here is in seeing which groups are now exceeding such a

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[4] It is recognized, without discussion, that a re-distribution within a limited period would probably require steeply graded inheritance and income taxes.

TABLE XIX

COMPARISON OF FAIR INCOMES AND ACTUAL INCOMES FOR GROUPS OF WORKERS ACCORDING TO TAUSSIG CLASSIFICATION AND FOR TEACHERS SEPARATELY

TAUSSIG CLASSIFICATION	COMMON LABOR	SEMI-SKILLED	SKILLED	CLERICAL AND TRADE	PROFESSIONAL AND EXECUTIVE	TEACHERS
Alpha Median *	35	42	58	90	131	136
Alpha Middle 50 Per Cent	21–63	23–69	35–86	66–118	106–157	115–152
Combined Scale Median	12.53	12.96	13.94	15.89	18.39	18.63
Percentile Rank in Population	38.40	42.86	53.59	73.59	89.25	91.72
Sigma Position	—.30	—.18	+.09	+.63	+1.32	+1.38
Total Fair Income	$1,670	$1,748	$1,923	$2,274	$2,723	$2,762
Actual Income †	902	1,097	1,835	1,950	2,400	1,350
Shortage	$768	$651	$ 88	$324	$323	$1,412
PER CENT ACTUAL INCOME IS SHORT OF FAIR INCOME	46	37	5	14	12	51
Minimum Fair Wage (with Maximum Allowance for Property Income)	$1,080	$1,132	$1,246	$1,477	$1,792	$ 1,797
Actual Income	902	1,097	1,835	1,950	2,400	1,350
DIFFERENCE ACTUAL WAGE AND LEAST FAIR WAGE	—$178	—$35	+$589	+$473	+$608	—$447

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* Proctor, W. M., *Psychological Tests and Guidance.* Public School Publishing Co., Bloomington, Ill.

† Wage figures calculated from respective hourly rates of .427, .525 and .878, with Douglas' estimate of unemployment. For "Clerical and Trade," King's average for all salaried workers is taken. For "Professional" (earned income only) the second highest group average of King's figures for salaries. This eliminated the most extreme and it seemed possible, from a review of earnings of physicians, governmental officials, ministers, teachers, school principals, engineers, etc., that $2,400 would not be far wrong.

minimum and which are not reaching it. We see again the unfavorable state of unskilled and semi-skilled labor and of teachers. These figures suggest, indirectly, at least, that skilled labor, clerical and trade groups, and professional groups are actually getting some property income on the average—a condition that probably exists. They suggest that, on the contrary, unskilled and semi-skilled labor and teachers are getting little, if any, property income. This suggestion also probably conforms to the facts.

THE FAIR WAGE FOR TEACHERS

Elementary teachers with two years of training who were in service prior to 1925 showed, according to conclusions of Chapters V and VI, a mean intelligence 1.38 S.D. above the mean of the general population; the fair wage, accordingly, would fall at 1.38 S.D. above the mean wage of the entire gainfully occupied group. This would be $1,865 plus ($650 x 1.38) or $2,762. This amount would be subject to a deduction amounting to the average income from property that such teachers actually received up to a maximum of $965 (1.38 times $223, plus $657). If teachers received, on the average, no income from property, their average fair wage for the country as a whole would be $2,762. If they received, on the average, state contributions for annuity purposes of $75 a year each and no other income from property, their fair average salary would be $2,762 minus $75, or $2,687.[5]

It does not affect the argument concerning income from property to raise the question of how the property has been acquired. All our criterion of normal distribution of income requires is that all income shall be thus distributed and that the average total income of the group shall fall at its proper place. The income thus determined is the economic ideal earnings for the group. To reduce this ideal figure at once by the total property income fraction due the group, irrespective of whether it was being received or not, would leave unearned income untouched and, to the degree that ideal figures have any effect, would tend to prevent the group in question from accumulating its fair share of capital holdings.

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[5] On page 296 of his *Income in the United States—Its Amount and Distribution, 1909–1919*, Vol. II, King reports on a study of the proportionate amount of teachers' incomes that is attributed to returns on investments. In this study 1,602 teachers reported from five cities. The result was that income from investment equaled 5.98 per cent of salary, or 5.64 per cent of the total income. This percentage, applied to the average fair income given above, would indicate a fair average salary of $2,600. National Bureau of Economic Research.

The fair average income of elementary teachers of two years or more of training in 1925 would then fall somewhere between $1,797 and $2,762, depending upon the average amount of income from property received by such teachers. The range of fair incomes for such teachers for the entire country would be from $1,865 to $3,487. The middle 68 per cent of teachers range in intelligence 1.87 S.D. on either side of their mean of 18.63, Combined Scale. That is to say, they range from 16.76 to 20.50, Combined Scale. On the distribution of intelligence for the population, this is equivalent to a range of +.87 S.D. to +1.91 S.D. The fair range of incomes corresponding to this range is from $2,430 ($1,865 plus .87 times $650) to $3,106 ($1,865 plus 1.91 times $650). These figures are, of course, subject to deductions for income due to property holding.

A refinement of these approximate ideal salaries would require two sets of index numbers, one corresponding to varying living costs in different geographical sections and the other bearing some relation to the teacher's length of service and qualifications, below and above the standard adopted in this study. The construction of such indices would bring in the only legitimate use of living costs that, from the point of view of this study, would seem desirable. In adapting an average income to various economic conditions and in determining minimal salaries, the use of such data would seem to be valuable and defensible.

Determining fair wages for occupational groups by the method just described requires very much fuller information than we have at present in the fields of economic facts and measurements of ability. Beyond this need is the necessity for constant revision of ideal wage figures in the light of changing conditions. The income for 1930, for instance, would give a different and higher set of figures than those arrived at for 1925. The economic interest of the whole social group demands (1) constantly revised determinations of fair wages for various occupational groups, calculated from accurate and comprehensive economic data; and (2) information resulting from gradually improved and extended methods of determining the levels of ability demanded for various occupations.

CHAPTER VIII

PRACTICAL IMPLICATIONS OF THE CONCLUSIONS

A. SUMMARY OF THE CONCLUSIONS

Starting with the general criterion of the highest economic welfare for the entire social group of the country, this study has proceeded through the following steps:

1. Translation, by means of the reasoning of Pigou, of maximum national dividend into terms of the average wage for any occupational group that would contribute most to the maximum dividend. This optimum wage was shown to be, on the average, equal income for equally scarce native ability.

2. Argument to show the partial effect on the national dividend of the inclusion of anything less than the total national dividend in an optimum distribution governed by the scarcity of varying levels of ability. This argument proposed the distribution, in accordance with the natural distribution of ability, of property income as well as of earned income.

3. Determination from available data of the probable scarcity of the level of intelligence demanded of elementary teachers of two years of training in service during 1925. This was calculated to fall at a percentile position in the population of 91.77. Comparisons with other groups were made to render this percentile position more concrete and meaningful.

4. Calculation by means of the tables of H. L. Moore of (*a*) an estimated distribution of actual incomes and (*b*) a distribution of total income that would result from allocation according to ability on the basis of minimum income of $250. These distributions were compared as to effect on total economic welfare and on individual economic welfare. The percentile income on the normal distribution that corresponded to the percentile intelligence of teachers was found to be $2,762. The percentile fraction of this income to be attributed at most to income from property

was found to be $965. The conclusion was that the fair income for elementary teachers in 1925 would have been, on the average, $2,762 and that the fair average salary of such teachers would have fallen between $1,797 and $2,762, depending upon the amount of income from any form of property received by the average teacher.

5. In brief, the conclusion of this study is that the minimum average salary for elementary teachers of two years of training in 1925 that would have contributed most to the maximum economic welfare of the entire country was not less than $1,800, and was almost certainly several hundred dollars more than that amount. In other words, the whole social group in the United States could not, in its own dollars-and-cents interest, afford to pay teachers an average salary of less than $1,800.[1]

6. The actual average salary of all teachers and principals, according to the correction of Douglas [18: 381], was $1,263. This figure does not apply exactly to elementary teachers of two years of training. A subtraction would have to be made for teachers of less than this amount of training, who numbered not less than one-half of the total group in 1925. An addition tending to balance this subtraction would have to be made for secondary teachers and administrative officers included in this average whose training and positions tended to raise their salaries. That this salary is probably a little low for elementary teachers of two years of training is indicated by Norton's report [37: 12]—that teachers in cities of from ten to thirty thousand population received an average salary of $1,354.[2] These city teachers

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[1] The conclusion stated here would not be vitiated if the entire consideration of property income were dropped. If Copeland's estimate in *Recent Economic Changes* [16: 767] be accepted—of 31 per cent of all income being attributed to property—and only *earned* income be distributed normally, the mean earned income becomes $1,290 for 1925 and the standard deviation, $434. On this basis the fair wage for teachers becomes ($1,290+434×1.38), or $1,889.

[2] The data given for cities are as follows:

Size	Over 100,000	30,000 to 100,000	10,000 to 30,000	5,000 to 10,000	2,500 to 5,000
Number	56	160	281	366	580
Average Salary	$1,844	$1,528	$1,354	$1,231	$1,129

Since the increasing numbers of small cities tend to balance the average number of teachers per city in larger communities, the figure for the middle size was thought to be most representative. Therefore $1,350 was adopted as more nearly representing the average salary for teachers of two years of training than the average for all teachers given by Douglas, $1,263. Research Division, National Education Association.

more nearly conformed to the requirement of two years of training beyond high school than teachers throughout the country. If $1,350 is taken as more nearly representative of the actual salaries of elementary teachers of two years of training in 1925, the fair salary arrived at in this study indicates that the actual pay of teachers should have been at least one-third larger than it was. This statement may then be taken to be the central conclusion of this study, namely, that the economic interests of the country as a whole would be best served if teachers were paid, on the average, one-third more than they are actually receiving. Changes since 1925 both in the amount of training demanded of teachers and in the amount of the total national income would have operated to raise this estimate.

B. IMPLICATIONS OF THE CONCLUSIONS

The conclusion just stated raises the question of an explanation of the discrepancy found. Wages rise and fall in response to supply of the workers in relation to the demand for their services. A relatively low wage always means an over-supply, actual or potential, of workers in the field where such a wage is paid. In Chapter III it was shown that the point at which wages tend to level out in response to balance between supply and demand is that of equal pay for equal ability. Any discrepancy between the actual wage received by a group and its fair wage is a rough measure of lack of adjustment of numbers to demand. A wage below the fair wage indicates too many workers offering their services in relation to the demand. In like manner, a wage higher than the fair level indicates a shortage of workers. A reason for a teaching wage lower than the economic fair amount is to be looked for in the fact that more persons offer teaching service than are needed in the occupation.

This explanation in itself needs analysis. The following reasons are cited as tending to explain the over-supply.

1. Training for teaching is one of the few types of vocational training offered without cost by the state. Therefore more persons are enabled to receive such training than is the case in other occupations requiring a like ability. That this factor has a real effect is further evidenced by the low salaries in ordinary

clerical positions, for which, among all occupations, our public high schools offer a sort of training without cost. The effect of free training is not in itself an economic force. The difference in pressure between the number of persons seeking free occupational training and the number able and willing to pay for such training constitutes the economic force.

2. Teaching is, to the extent of about 83 per cent, a woman's occupation under present conditions. The opening of the doors of this occupation to large numbers of unmarried women who, a few decades ago, were not generally gainfully employed, while other occupations remained almost closed to them, has resulted in an actual and potential over-supply of candidates for teacher training. The more recent mechanization of functions that formerly occupied women in homes has released large numbers of women, both married and unmarried, who are no longer of economic necessity retained in homes, for the relatively narrow range of occupational opportunities open to them. These two large groups represent just as truly an artificially maintained over-supply of women's labor, as has usually been the case with unskilled men. The result is the same in both cases, a very low relative wage. The more fundamental explanation of low teachers' salaries is not in the fact that women's wages are, on the whole, about 62 per cent of men's wages, but that artificial barriers restrict women from spreading over the full range of occupations within their actual abilities. Again, the economic force is not the fact that teachers are mainly women, but that the narrowing of the outlet for their activities increases the pressure of an otherwise unchanged number who have the need and the desire to work. The maximum national dividend does not require that workers be of one sex or the other or that they be distributed in any particular proportions. What is demanded by this economic criterion is a certain relative wage level corresponding to a certain relatively scarce native ability required for the occupational group under consideration. This may be called the ideal wage for this group. It does not take into account any restrictions as to age or sex that may happen to prevail for this group.

Such restrictions may be of two kinds. They are either more or less adventitious and subject to varying fashions, or else they are determined by some factor difficult or impossible to change. These relatively fixed factors are, again, of two kinds. They are fixed by some biological limitation of direct or indirect influence, such as the lack of strength in women for heavy work or their refusal of dirty work because of its influence on their marriageability. Or they may be relatively fixed in response to some social demand which is itself relatively permanent, such as, perhaps, the demand that only women teach small children. A variant of this case is the demand in our day that only *young* women teach because they are the cheapest acceptable workers available. We have, then, three recognizably different conditions affecting wages that help to account for variations from the economically ideal wage:

a. Accidental restriction of the occupation to an age or sex group that cannot claim the full wage.

b. Relatively permanent restriction, owing to relatively permanent demand.

c. Permanent restriction owing to permanent biological factors.

The question is raised whether, in these conditions, corrections of the ideal wages are not demanded.

The answer differs for the different conditions. If the conditioning factor is merely accidental, the economic criterion demands that such a factor be changed. If the factor is relatively permanent, the criterion demands a study to determine whether the values obtained from its continuance are of more worth than the economic welfare constituting the source of the criterion. If study indicates that the restricting factor should be maintained, a correction in the ideal wage is required. If economic values are more important than those served by the special condition, the condition should give way.

When the restriction is permanent and unalterable, a correction *must* be made in the ideal wage. Whether such limitations of an occupational group are of one kind or another is a question for study. In no case can the continuation of such limitations be justified simply because they happen to exist.

Wherever such a restriction is one of sex, there is raised the question of existing restrictions of the number of occupational places that women can and will hold. To the degree that study tends to show a permanent over-supply of women able and willing to work in relation to the places they can and will take, a correction of the ideal wage will have to be made for all occupations permanently held mainly by women. This correction would have some determinable relation to the degree of over-supply, which was permanently beyond the ability or the enlightened wish of society to change, no matter how advantageous such a change might be from a purely economic view.

Aside from such biological limitations as lesser strength and withdrawals for maternity and for child nurture, the question of whether women belong in industry is one to be settled on other than economic grounds. Any proposal to make a flat correction of our fair wage for teachers corresponding to the difference between men's and women's wages under present conditions would be to the effect of maintaining a socially and economically disadvantageous wage by glossing over more fundamental facts.[3]

3. The factor of ignorance noted by Pigou operates to swell the ranks of candidates for teaching. Information as to the demand for teachers in relation to the supply has been almost totally lacking. A little of such information was called forth at a few points only recently when the numbers of persons training for teaching had increased to about half the total number actually engaged in the work [20: 315].

4. Closely allied to the preceding causes is the lack of planning on the part of teacher-training agencies. In the interest of increasing the size of individual training schools throughout the

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[3] An interesting variation is raised by the question of age distributions and occupations. The economic fair wage under discussion assumes a normal distribution of age, or what amounts to the same thing—experience—within the whole age or experience range permitted in the occupation. Earnings would vary in both directions from the average in accordance with age throughout the group. Wherever a condition prevailed in an occupation tending to skew the distribution in either direction, the actual effect upon the average wage of the group would be to change it in accordance with the degree of skewness. Under present conditions this is true of teaching. Low standards of entrance have allowed a large number of young women to teach in premarriage years. At the same time rising standards have tended to replace experience by training, putting a further premium on youth. Thus we have a teaching group whose age distribution is skewed considerably toward the lower end. The actual effect is to lower the average wage of the group. In accordance with the previous discussion, the extent to which this is a permanent situation would determine whether or not a correction is demanded in the fair wage found for teachers.

country, candidates have until recently been all but dragooned into these schools. At the same time training schools have multiplied in number. No central organization has attempted to learn all the facts and place them before the country as a whole and before those responsible for the supply of trained teachers.

5. Related somewhat to all the above reasons is the fact of low standards for entrance into the teaching profession. Communities have accepted in large numbers for their schools teachers of no specific and little general training. The two years of training beyond high school now accepted by general consent as the minimum standard would not in itself, so long as the training is free, operate to bar any but persons of the lower ranks of intelligence. The lower the threshold of admission into an occupation, the larger the numbers that will succeed in flowing over it. In summary, it may be said that low entrance standards and a lack of planning have allowed the natural flow of large numbers influenced by changing economic conditions to go unchecked into one of the few occupational outlets open to them.

C. PRACTICAL IMPLICATIONS

If teachers' salaries would have to be increased by one-third to provide teachers with a fair economic wage, does the conclusion follow that members of the profession, members of professional organizations, and interested laymen should immediately start out upon a campaign to raise teachers' salaries by one-third? No such conclusion can be allowed to hold. Pigou and other economists have discussed at some length the effect of arbitrarily raising wages. Economically, it is a procedure rarely justified and one against which the burden of proof must always lie. It is analogous to treating the symptoms of a disease in entire ignorance of the underlying causes. The only attack upon unfairly low wages that can be justified from an economic point of view is a discovery of the economic forces and their causes that have tended to produce the low wage. No discrepant wage exists without real causes. The way to bring wages into line with the demands of the criterion of maximum dividend is to set in motion, by intelligent controls and planning, economic forces that will, themselves, bring the wage to its proper position.

It is true that where wages are so bitterly low as to prevent any group of workers from being other than a drag on the whole economic system, no great harm, and a large amount of good, may perhaps result from an arbitrary raising of such wages. This theory is according to the principle that the feeding of a starving man should perhaps not wait upon the scientific achievement of a balanced diet. Even so, such arbitrary action cannot be entirely without discretion. In the present stage of rapid mechanization of industry and technological advance, when production is outrunning the consuming abilities of a population restricted in its consumption by the artificial retention of 59 per cent of its workers below a wage where any choice of expenditure is possible, it might be argued that an arbitrary raising of some of our lowest industrial wages could result in nothing but good. It has actually seemed to work out that way to some extent in certain industries where it has been tried. In this study no such procedure is to be defended with reference to teachers. The listing in the previous section of the reasons for the over-supply of teachers was intended to point toward economically justifiable means of attacking the unfairly low wage of teachers.

The forms of attack on the unfair wage of teachers that could be logically defended in this study may be set forth in the following paragraphs:

1. A re-valuation in the minds of the profession and of the public of the native intelligence of actual teachers would be a justifiable change. We have recruited large numbers of teachers among the girls graduated from rural and village high schools and have given them little or no training. At best, until recently, we have provided two years, largely of training in mechanical skills, in normal schools only a little less provincial than the communities from which the students came. We have then judged the intelligence of the product principally by the limited culture achieved through this régime. That our judgment has been at fault is indicated by the conclusions as to the native intelligence of our teachers set forth at the end of Chapter VI. To what extent this judgment has been influenced by the natural tendency to judge the intelligence of women by their adaptation to the standards of a man's world, it is impossible to say. That teachers,

as a class, exhibit grave shortcomings in relation to the needs of their occupation need not be denied, but the evidence would indicate that these shortcomings are to a very large degree environmental rather than inherent. To this extent the kind of teachers we have and the kind we shall get are entirely within social management. Corollary to this statement is the proposal that in the *absence of efforts* immediately and arbitrarily to revise teachers' salaries sharply upward, an important gain would be made by a *revision of ideas* as to what a fair wage for teaching would be.

2. Much has been said in recent years in favor of raising the standards of training and of requirements for teachers. That such a movement is going on is certain. It is beside the purpose of this study to reiterate the argument for improved standards, but it is pertinent to say that if it is desirable to improve standards, the opportunity exists and that, if effective, such a movement would tend toward the gradual upward revision of teachers' salaries. This would come about only partly because of more highly selected intelligence. The remainder of the improvement would be attributable to the smaller numbers who would persist through more exacting requirements. The raising of standards, together with the rising salary, would have the effect of inducing a rise in the average age of teachers through both later entrance and tendency to longer tenure. It would also probably have the effect of bringing more men into the occupation. It is possible that an approximation of the economic wage, with professional standards of training, would to an important extent remove the differentials in age and sex that were discussed at some length in the preceding section.

3. A most vital contribution could be made to the upward movement of salaries by the organization by the state or the profession, or by both, of agencies for planning the inflow of candidates for teaching, and for the wide dissemination of information as to the economic situation of the profession. Control through information and by actual limitation of numbers to meet the demand would probably do more than anything else to bring about a fair wage.

4. The administrative measures just advocated would in

themselves face great difficulties if nothing were done to reduce the numbers who wish to enter training for teaching. The numbers of unoccupied and semi-occupied women would not be reduced, and, if their opportunities for employment were in no way widened, these numbers would simply be dammed up against the controlling barriers. The enormous pressure so created would inevitably find an outlet in political and other forms of activity that would tend to weaken and destroy the controls. For this reason, every effort to widen the range of occupational opportunities for women is to be recommended. One method of attack at this point is the improvement of other unfairly low wages. The literature of economics furnishes proof that as the wages of men rise, the number of women gainfully employed falls. Still further, as per capita productive capacity increases, it becomes less necessary for the average worker to be employed during so much of his time. A reduction of hours of labor for all laborers, without reduction of earnings, if carried on at a fairly rapid rate, might furnish additional opportunities for women.

5. The provision of publicly supported vocational training in a few occupations necessarily cheapens the earnings in these occupations. Since the cost and difficulty of obtaining vocational training has been shown to be one of the barriers to free occupational mobility, and, consequently, to the natural leveling of earnings according to ability, the direction of improvement is not in the removal of existing public support of vocational training, but in the extension of such opportunities to all vocations. There is no particular reason, except a possible lack of courage, why educational statesmanship should not adopt as an ideal a socially organized training for all workers to complete vocational efficiency that would be entirely free of individual costs. The extension of such a plan to include re-training for the technologically displaced and to include liberal and cultural education for the promotion of more intelligent consumption, is an ideal that need not affright an age that has caught a glimpse of the virtually unlimited control of natural sources of power.

From the foregoing discussion, it will perhaps be clear that this study holds out no hope of properly adjusting the teacher to the economic situation without taking into account all other occupations. The promise of modern economic theory lies in its thoroughgoing adoption of the widest possible social philosophy as the source of its controlling criteria. Fair wages for teachers mean fair wages for all groups, but conditions affecting particular groups must be viewed, studied, and attacked in particular. This study proposes to do no more than exhibit teaching as a sample occupation for the exploitation of a method of determining the distribution of income—a method that, in the light of present knowledge, appears to offer the greatest promise for the general economic welfare.

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APPENDIX A

PROOF THAT THE REPRESENTATIVE SAMPLE AND THE LARGER SAMPLE CANNOT BE SIGNIFICANTLY DIFFERENT

	Representative Sample	*Larger Sample*
N	4,204	6,554
Median	128.2	127.6
σ	27.4	.....

The condition to be satisfied for the groups to be significantly different is that

$$(1)\qquad \frac{\text{Difference of the medians}}{3\sigma\text{ difference of medians}} = \text{or} > 1$$

$$\text{Difference of medians} = .6$$

$$\sigma\text{ difference of medians} = \sqrt{\sigma^2_{\text{mdn}_1}+\sigma^2_{\text{mdn}}}$$

$$\sigma\text{ medians} = \frac{5}{4}\cdot\frac{\sigma}{\sqrt{N}}$$

Substituting known values in (1) gives

$$(2)\qquad \frac{.6}{3\sqrt{\left(\frac{5}{4}\cdot\frac{27.4}{\sqrt{4204}}\right)^2+\left(\frac{5}{4}\cdot\frac{\sigma x}{\sqrt{6554}}\right)^2}} = \text{or} > 1$$

$$(3)\qquad \frac{.2}{\sqrt{.2809+\left(\frac{\sigma x}{65}\right)^2}} = \text{or} > 1$$

$$(4)\qquad .04-.2809 = \text{or} > \frac{\sigma x^2}{4225}$$

$$(5)\qquad -1018 = \text{or} > \sigma^2$$

which is absurd. The least value for the difference of the medians that would give any positive value for the first term of (5) is 1.5. The groups, with their given difference of .6, cannot be significantly different.

APPENDIX B

METHOD OF CONSTRUCTING AN ESTIMATED CURVE OF DISTRIBUTION OF ACTUAL INCOMES IN THE UNITED STATES DURING 1925

Complete and comprehensive data on actual individual incomes are nowhere available. There is, however, a considerable body of statistical material that will aid not only in constructing such a curve but in checking its approximate accuracy. Since, for the purpose of this study, no accurate calculations need be based on such an actual distribution, recourse was had to Moore's theoretical method of constructing such a curve. With proper safeguards, such a curve, depending upon factual knowledge in its construction and checked as a whole by other facts, was thought to be sufficiently accurate for comparative purposes.

Moore's theory requires groups with approximately unhampered internal competition. This can be accomplished to a measurable degree by division of the whole group of gainfully employed into various groups within which the earnings will have a continuous variability. The method provides for the fact that the half of the group that receives the higher incomes gets more than half of the total amount. But it requires knowledge for each group, of these data: (1) the total group income, (2) the minimal income for the lowest 1 per cent, (3) the per cent of the total income received by the half of the group receiving the higher earnings. These requirements can be met fairly well if the entire group of employed workers in the United States be divided into four groups, as follows: (1) agricultural laborers, (2) non-agricultural wage earners, (3) salaried workers, and (4) enterprisers and owners. For these four groups, King [26: Chap. V, VI] gives us estimated total incomes, average annual earnings, and some additional facts that are helpful.

The greatest difficulty is in estimating the differential reward of the upper half of each group. Unless the upper half receives a share in the neighborhood of 60 per cent or more of the total group income, Moore's Standard Population table cannot be used. The distribution must then be calculated by means of his table of Average Differential Ability [35: 98]. There is no evidence to settle this question in the case of agricultural laborers; apparently no sharp division into unskilled, semi-skilled, and skilled exists. Leven [28: 95] found that in 1919 there were two wage levels in agriculture, following geographical divisions of the country, which were almost parallel when plotted and which were approximately $200 per annum apart. These geographical divisions, however, would be cut across by age and skill differences, and, in the absence of known divisions in agricultural labor, it seems safer to suppose that variability of farm wages will be covered sufficiently well by a table that does not provide for large differences between upper and lower halves.

The case of non-agricultural wage earners is somewhat different. Here we have rather clear divisions. It is, of course, true that these tend to merge as mechanization of industry proceeds. But an *a priori* judgment that the skilled half in a wage earner distribution will receive 60 per cent or more of the total group income seems reasonable. In order to settle this question, a re-classification of the wage earners as given by the 1920 census was undertaken in order to obtain percentages of unskilled, semi-skilled, and skilled workers. Doubtful cases were left out, and in one or two instances, such as the field of construction, where great differences exist in estimates of the number of skilled laborers, some adjustment of the figures was made. In the case of construction the estimate of Douglas [18: 426, Table 157] was taken to be fairly accurate. This re-classification gives twenty-two and one-half million workers, as compared with the estimate of King of somewhat more than twenty-three million wage workers in 1920, excluding those in agriculture. The grouping results as follows: unskilled 27.7 per cent, semi-skilled 47.9 per cent, skilled 30.4 per cent.[1] The attempt was next made to arrive at a defensible average wage for each of these groups. Since we are interested in comparison, only the hourly wage, which seems most secure, was used. Figures were obtained from King, Douglas, National Industrial Conference Board, Wolman in *Recent Economic Changes* and the *History of Wages in the United States from Colonial Times to 1928* by the Bureau of Labor. Some help was also furnished by the figures in *Middletown*. Rough weights were applied to iron out such differences as exist between factory labor and highly unionized groups in construction and transportation. For unskilled labor, Douglas's hourly wage of 42.7 cents was finally adopted as being, on the whole, the most accurate [18: 182]. For semi-skilled workers, with allowance for the large percentage of women, the result of calculation was 52.5 cents per hour. The rate for skilled workers is somewhat more securely based. It tends to fall a little above 80 cents; it is pulled up to 87.8 cents by the very high earnings of the union trades in construction. The percentages given above and these hourly rates were used to calculate the percentage of total income that would go to the higher-paid half of the whole wage earning group. The result of this calculation was 64 per cent. This figure is less than the actual percentage because each group was treated as if it were a block, leveling up to its average hourly rate, when, as a matter of fact, the situation would be represented by three accelerated curves, and the percentage going to the top half would be raised by the transfer of some of the highest-paid in lower groups for some of the lowest-paid in higher groups.

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[1] This checks roughly with *Middletown* (p. 508), where twenty-six out of one hundred working class men in an industrial city are given as unskilled, and thirty-three may be judged by designated occupations to be definitely in the skilled group.

The determination of a similar figure for salaried workers is a matter of guesswork. Figures are lacking, particularly in the higher salary range. We know that there is a great variability in salaries. Treating the average of each industrial group separately gives 66 per cent. When the groups are weighted, this average falls to 59 per cent, which is almost certainly too low, for the reason that the higher salaries of the lower industrial groups would overlap a great deal the lower salaries of the higher groups. In view of these facts, and since the direction of conservatism is toward lack of skewness, the figure found for wage earners of 64 per cent was adopted for salary earners with their greater variability.[2]

In the case of enterprisers and owners, there is one considerable source of error in the fact that a number of owners are not gainfully employed. This fact has been disregarded. Since more than half of the enterpriser class are farmers and King gives us an estimate for all their incomes, it is a simple matter to calculate the percentage of the enterpriser's total income that would go to the lower half of the group, who are a known percentage of the farmer-enterprisers. In the enterpriser group, we have, for the higher half, a share of at least 82.3 per cent.

The minimum income for each of these groups was adopted rather ar-

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[2] At this point another test was made of Moore's Standard Population table, using the following data from King [26]:

Total Number of Employees	33,847,000
Total Income of Employees	$46,855,000,000

Using 64 per cent as the share of the better paid half and $250 as the minimum, the following distribution was obtained:

Earnings in Dollars	*Per Cent*
0– 500	3
501–1,000	18
1,001–1,500	41
1,501–2,000	27
2,001–2,500	10
2,501–3,000	1
	100

Highest 1 per cent	$2,692
Q_3	1,695
Median	*1,341*
Q_1	1,041

Mean $1,370
S.D. 500

That these findings check so nearly with estimates in Table XXIII is another indication of the worth of the method.

bitrarily. This is the income supposed to be obtained on the average by the lowest 1 per cent. Small variations in the minimum do not greatly affect the shape of the final curve. In the case of laborers the minimum income was placed at $250 per year. This takes into account the low average wage of agricultural laborers and, in other industries, the average wage of three million children between the ages of ten and seventeen gainfully employed [59: 482]. In the case of salaried workers and enterprisers, the minimum was put at $500. This may be a trifle high in the case of the owners, of whom so many are farmers who probably had no actual net income when living is balanced against loss of principal. The estimates discussed thus far are reviewed in the following summary:

DATA FOR VARIOUS GROUPS, TO BE USED IN CALCULATING THEORETICAL DISTRIBUTION

	AGRICULTURAL LABORERS	NON-AGRICULTURAL WAGE EARNERS	SALARIED WORKERS	ENTERPRISERS AND OWNERS
Number of Workers * (thousands)	2,290	23,860	7,697	9,997
Total Income * (millions of dollars)...	1,204	29,558	15,370	35,076
Adopted Minimum......	$250	$250	$500	$500
Estimated Percentage of Total Income Collected by Higher-Paid Half ..	50	64	64	82.3

* King, *op. cit.*

On the basis of these estimates, Moore's method and his Standard Population table [35: 103] were used for all groups except agricultural workers. His Average Differential Ability table was used for agricultural laborers. The result of these calculations is the collection of group distributions and the total when ordinates are added, given in Table XX. Table XXI gives percentage distributions for each group and for the total that result from adding the ordinates of the four groups. Because of the possibility that the apparent skewness of this distribution is less than the actual skewness, the distribution of income tax returns from the report of the Bureau of Internal Revenue for 1925 [60: 90–1] was consulted. This distribution covers a little more than four million returns. It is given on a chart in the beginning of the report and reported in per cents [60: 90]. It happens that the number of these returns is about one-tenth of the number of gainfully employed given by King for 1925, upon which my theoretical distribution is built. In my distribution the percentage receiving incomes of $3,000 or less is almost exactly 90. Upon the judgment that there

TABLE XX

DETAILS OF THEORETICAL DISTRIBUTION OF INCOME, 1925—NUMBERS OF GAINFULLY EMPLOYED RECEIVING VARIOUS INCOMES

INCOME IN DOLLARS	AGRICULTURAL WAGE EARNERS	ALL OTHER WAGE EARNERS	SALARIED WORKERS	ENTERPRISERS AND OWNERS	TOTAL (DISREGARDING UNEMPLOYED OWNERS)
0– 500	938,900	715,800	76,970	99,970	1,831,640
501– 1,000	1,351,100	5,965,000	384,850	799,760	8,500,710
1,001– 1,500	....	10,021,200	1,462,430	3,299,010	14,782,640
1,501– 2,000	....	5,487,800	2,386,070	1,099,670	8,973,540
2,001– 2,500	....	1,760,200	1,616,370	399,880	3,686,450
2,501– 3,000	....	....	1,077,580	299,910	1,377,490
3,001– 3,500	....	....	461,820	399,880	861,700
3,501– 4,000	....	....	153,940	299,910	453,850
4,001– 4,500	....	....	76,970	399,880	476,850
4,501– 5,000	....	....	....	299,910	299,910
5,001– 5,500	....	....	....	299,910	299,910
5,501– 6,000	....	....	....	299,910	299,910
6,001– 6,500	....	....	....	199,940	199,940
6,501– 7,000	....	....	....	299,910	299,910
7,001– 7,500	....	....	....	199,940	199,940
7,501– 8,000	....	....	....	199,940	199,940
8,001– 9,000	....	....	....	299,910	299,910
9,001– 10,000	....	....	....	299,910	299,910
10,001– 11,000	....	....	....	99,970	99,970
11,001– 12,000	....	....	....	199,940	199,940
12,001– 13,000	....	....	....	99,970	99,970
13,001– 14,000	....	....	....	....	....
14,001–15,000	....	....	....	99,970	99,970
TOTAL	2,290,000	23,860,000	7,697,000	9,997,000	43,844,000

was very little overlapping between the income table percentage *above* \$3,000 and my groups *below* \$3,000, the decision was made to form a composite distribution by adding to the ordinates of the income tax distribution, my ordinates up to \$3,000. This resulted in the Composite Distribution in Table XVII (repeated on page 109). It is believed that the trailing off of incomes above \$3,000 and the piling up of the lower groups are better represented by this composite.

Column 4 in Table XVII represents another attempt to arrive at a distribution of actual incomes throughout the country. This was made by

TABLE XVII

Theoretical, Composite, and Normal Distributions of Income in Per Cent of Number Gainfully Employed Receiving Various Incomes in 1925, and Norton's Distribution for 1927

Income in Dollars	(1) Theoretical Distribution	(2) Income Tax Returns, 1925	(3) Composite Distribution	(4) Norton's Distribution, 1927	(5) Normal Distribution
0– 500	4.18		4.22	2.3	2.00
501– 1,000	19.39	2.35	19.54	13.7	7.00
1,001– 1,500	33.72		35.20	23.3	19.00
1,501– 2,000	20.47	25.70	21.37	25.8	30.00
2,001– 2,500	8.41		9.80	18.3	26.00
2,501– 3,000	3.14	20.20	3.66	8.2	12.00
3,001– 3,500	1.96		1.96	2.7	4.00
3,501– 4,000	1.03	17.92	1.04	1.7	
4,001– 4,500	1.09		.81		
4,501– 5,000	.68	13.91	.51	1.5	
5,001– 5,500	.68		.20		
5,501– 6,000	.68	4.18	.20	.7	
6,001– 6,500	.46		.13		
6,501– 7,000	.68	2.91	.13	.4	
7,001– 7,500	.46		.10		
7,501– 8,000	.46	2.15	.10	.3	
8,001–			.08		
9,000	.68	1.58	.07	.2	
9,001–			.06		
10,000	.68	1.26	.06	.15	
10,001–			.05		
11,000	.23	.95	.04	.12	
11,001–			.04		
12,000	.46	.77	.03	.10	
12,001–			.03		
13,000	.23	.64	.03	.07	
13,001–			.03		
14,000		.53	.02	.05	
14,001–			.02		
15,000	.23	.45	.02	.04	
Above 15,000		4.53	.43	.39	
	100.00	100.00	100.00	100.00	100.00
Median	$1,391	$3,098	$1,373	$1,709	$1,865
Mean	1,840	3,295	1,625	1,865	1,865
S. D.	1,670	3,450	1,280	1,105	650

Dr. J. K. Norton for 1927, working from the statistics of income for 1925 [60: 90] and from estimates of the National Bureau of Economic Research. Dr. Norton's distribution is skewed considerably less toward the low income brackets and yields central tendencies much higher. His mean, for instance, is identical with the mean furnished by my *normal distribution*. By the general checks used to test the composite distribution, Dr. Norton's table does not fit so satisfactorily independent facts used for this purpose. This lack of fit will be shown at a later point.

Raising the question of why his distribution apparently does not agree closely with other estimates of income facts directs the attention to certain details in his figures. He has only 2.3 per cent in the class of incomes below $500. In my table, agricultural laborers alone furnish 2.1 per cent

TABLE XXI

Percentages of All Gainfully Employed (1925) in Four Main Groups Receiving Various (Average) Incomes

Income in Dollars	Agricultural Wage Earners	All other Wage Earners	Salaried Workers	Enterprisers and Owners	Total (Disregarding Unemployed Owners)
	Per Cent	*Per Cent*	*Per Cent*	*Per Cent*	*Per Cent*
0– 500.....	2.1	1.6	.2	.2	4.18
501– 1,000.....	3.1	13.6	.9	1.8	19.39
1,001– 1,500.....	...	22.9	3.3	7.5	33.72
1,501– 2,000.....	...	12.5	5.4	2.5	20.47
2,001– 2,500.....	...	3.8	3.7	.9	8.41
2,501– 3,000.....	...	....	2.5	.7	3.14
3,001– 3,500.....	...	....	1.0	.9	1.96
3,501– 4,000.....	...	....	.3	.7	1.03
4,001– 4,500.....	...	....	.1	.9	1.09
4,501– 5,000.....	...	....	....	.7	.68
5,001– 5,500.....	...	....	....	.7	.68
5,501– 6,000.....	...	....	....	.7	.68
6,001– 6,500.....	...	....	....	.5	.46
6,501– 7,000.....	...	....	....	.7	.68
7,001– 7,500.....	...	....	....	.5	.46
7,501– 8,000.....	...	....	....	.5	.46
8,001– 9,000.....	...	....	....	.7	.68
9,001– 10,000.....	...	....	....	.7	.68
10,001– 11,000.....	...	....	....	.2	.23
11,001– 12,000.....	...	....	....	.5	.46
12,001– 13,000.....	...	....	....	.2	.23
13,001– 14,000.....	...	....	....	....	......
14,001–15,000.....	...	....	....	.2	.23
	5.2	54.4	17.4	22.9	100.00

(of all workers) for this group. This is a little less than half the agricultural laborers and, in view of the general agreement from various sources on an average income for this group in the neighborhood of $540, it is reasonable to expect about this proportion under $500.

In addition, there are to be considered three million children under eighteen and nine million women, of whom a number are working at an average weekly wage of $13 in southern cotton mills. One must suspect that Dr. Norton's percentages for incomes under $500 and for incomes under $1,000 are smaller than they should be. All agricultural laborers receive less than $1,000 and at Douglas's figure for unskilled labor of 42.7 cents per hour, it is likely that a very large number of male laborers fall short of an annual income of $1,000. These, together with the ower-paid women workers, would furnish numbers considerably in excess of the 16 per cent allotted by him to income groups below $1,000. Norton, of course, warns against taking his distribution too literally [3] and in application scales his central tendency down considerably. It is also to be recalled that he used a different year. For these reasons Norton's distribution is not adopted, although it would have saved a very large amount of labor.

It is desirable to check both my composite distribution and my group distributions against such facts as are available. Table XXII gives for the various groups the mean and quartile earnings as determined by my theoretical distributions for the four groups and for the total. Table XXIII gives various estimates of annual earnings for comparison with the means and medians of Table XXII. The only considerable discrepancies here are between the figures for enterprisers and owners and for the total. If it be recalled that King's figures and those in *Recent Economic Changes* [4] are averages and that this group is skewed to the degree that the upper half of the number collected 82 per cent of the total income, it will be seen why the *medians* of my distribution and the *averages* referred to diverge so widely. The median enterpriser is a farmer who is exceeded in income by more than a million other farmers. The average farm enterpriser's income, computed from King's figures, is $1,240.46. This partly explains the differences in the enterpriser's column. A further explanation is in the facts that capital goods are not distributed in any sense according to ability and that the

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[3] Norton's actual comments are as follows: "The approximate character of these figures, . . . should be held definitely in mind as they are studied."

"The figures as to income of gainfully occupied persons should be looked upon as rough estimates based upon the best data immediately available. The estimated number in some income groups would probably vary substantially from the actual number if it were obtainable."

[4] *Recent Economic Changes in the United States.* Report of the Committee on Recent Economic Changes of the President's Conference on Unemployment, Herbert Hoover, Chairman; including the reports of a special staff of the National Bureau of Economic Research. McGraw-Hill Book Company, Inc., New York, 1929.

TABLE XXII

MEAN AND PERCENTILE INCOMES

Derived from Theoretical Distributions Calculated by Using Moore's Tables

AVERAGE FOR	AGRICULTURAL LABORERS	NON-AGRICULTURAL WAGE EARNERS	SALARIED WORKERS	ENTERPRISERS AND OWNERS	ALL GAINFULLY EMPLOYED
Lowest 1 per cent	$250.00	$250.00	$500.00	$500.00	$350.89
Q_1	453.51	965.90	1,511.40	1,300.35	1,176.00
Median	*525.76*	*1,221.60*	*1,874.38*	*1,644.31*	*1,372.75*
Q_3	601.45	1,571.93	2,467.04	5,236.03	1,875.30
Highest 1 per cent	801.52	2,497.72	4,033.25	14,072.79	5,467.31
Mean	550.00	1,280.00	1,970.00	3,295.00	1,625.00

TABLE XXIII

COMPARISON OF VARIOUS ESTIMATES OF INCOMES WITH CENTRAL TENDENCIES OF THE THEORETICAL DISTRIBUTIONS

AVERAGE ANNUAL WAGES ACCORDING TO	AGRICULTURAL LABORERS	ALL WAGE EARNERS	SALARIED WORKERS	ENTERPRISERS AND OWNERS	ALL GAINFULLY EMPLOYED
King (arithmetic average)	$526.00	$1,176.00	$1.950.00	$3,508.65	$1,868.69
Recent Economic Changes *	537.00	$1,384.00 ‡‡		3,790.00 *	....
Douglas (weighted averages)	587.00	1,280.00	2,239.00 † 1,776.00 ‡ 2,051.00 § 1,263.00 **		
Middletown †† (median)	....	1,303.00	....	....	....
Composite Distribution:					
Median	525.76	1,221.60 §§	1,874.38	1,644.31	1,372.75
Mean	550.00	1,280.00	1,970.00	3,295.00	1,625.00

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* Table 9 on p. 777. Enterpriser's average profit as reported in income tax returns, p. 780.

† Manufactures and railways.

‡ Government employees.

§ Postal employees.

** Teachers.

†† Range of income of working class families, $345 to $3,460.

‡‡ Includes agricultural laborers. A weighted average of my composite means gives $1,387, as comparable with the $1,384 in *Recent Economic Changes*.

§§ Composite figures are exclusive of agricultural laborers.

statistical theory behind the computation of my composite calculations is based on ability. As to the accuracy of employees' earnings, note the very close agreement of my weighted average with the comparable figure given in *Recent Economic Changes.*

Another check on the whole distribution may be made by means of percentage of workers having incomes of less than $5,000. King gives this percentage as 98.942. Again, if one refers to the table on page 91 of the *Statistics of Income* [60] for 1925, the total amount covered by income tax returns is available for each $1,000 of income. If the total of about twenty-one and nine-tenths billion dollars be subtracted from King's total income figure of about eighty-two billion and the cumulative percentage of income under $5,000 be added to the percentage formed by the remainder, we have still another calculation for this same result. This method gives 98.494. The percentage of incomes under $5,000 in the composite distribution is 98.11. Thus the percentage receiving incomes of less than $5,000 checks very well. In Norton's table, 97.5 per cent of the workers received incomes below $5,000. Another check is furnished by Morris A. Copeland on page 836 of *Recent Economic Changes.*[5] He estimates that in 1925 the wealthiest 10 per cent of the *population* received 32.9 per cent of the total income. In my distribution the 9.87 per cent of the *gainfully employed* who received the highest incomes collected 35.88 per cent of the total.

If, however, the *total amount* received in incomes less than $5,000 be considered, there is a divergence. King's figure is 86.84. The figure derivable from the income tax reports is 84.40, whereas the figure derived from my distribution is 78.07. This divergence is readily understood from the shape of the curve representing this distribution, given in Figure 6 on page 78. If the right-hand tail of the curve were extended on the same scale, it would require about 330 feet of paper to represent the fact of incomes exceeding five million dollars. The theoretical method of constructing the table does not take into account this extreme condition of inherited and concentrated wealth; it takes into account only such differences as might be expected to arise out of ability. For this reason, the highest forty-four salaries in the nation according to my distribution would average only $6,184.70, with the highest single income at $17,439.85.

In Norton's table incomes below $5,000 account for 91.5 per cent of the total amount of income. In other words, he estimates considerably fewer and somewhat larger incomes below the $5,000 line than are yielded by my distribution and by the independent sources noted above. The reason for considering the Norton distribution so carefully lies in the fact that his distribution indicates less skewness than my estimates, while all other indications are that the error of the composite distribution is on the side of a lower degree of skewness than actually exists in the distribution of income in this country.

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[5] Used by permission of McGraw-Hill Co.

The error is too small to be indicated on the scale of the curve included within the bounds of an ordinary page, but any judgment based on the amount that this curve deviates from the normal distribution will have a conservative basis.

VITA

Lester Dix was born in Parksley, Virginia, August 13, 1890. After an elementary education in the public schools of Baltimore and Cape May County, New Jersey, his secondary course was completed at the State Model School, Trenton, New Jersey, in 1909. He taught for three years in the rural schools of Cape May County, returned to the State Normal School at Trenton, New Jersey, and completed the teacher-training course in 1914. He served for four years as a teacher of special classes of boys in Plainfield, New Jersey, and, after a brief war service, served as supervising principal of elementary schools in Woodbridge, New Jersey, until 1928. At this time he resigned to take up full-time study at Teachers College, Columbia University, where he received the Bachelor of Science degree in 1928, and the Master of Arts degree in 1929. He was awarded a Teachers College fellowship in 1929, which was resigned when he became research associate in the Lincoln School of Teachers College, a position that he now holds. He is the author of various professional articles in the publications of the National Department of Elementary School Principals, in the *American City*, *School Executives' Magazine*, *Educational Administration and Supervision*, and *Teachers College Record*.